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THE

SEPTEMBER, 1946

Refrigeration

AIR CONDITIONING
EQUIPMENT

INDUSTRY

MERCHANDISING * INSTALLATION * MAINTENANCE



IN THIS ISSUE:

Solving the Cylinder Shortage . . . Hit 'Em While They're Hot
Super-Cooling in a Super Market...Cooling Load Calculations
Food Plant Air Distribution...Soda Fountain Troubleshooting



Turn on the COLD

EVEN if you are not a refrigeration engineer, this valve *should* be of interest to *you*, for it illustrates the precision workmanship that is characteristic of *all* Weatherhead products.

Weatherhead engineers *never* assume that a product cannot be improved in design to simplify its application, increase its life, or to lower cost. For it is their responsibility to find new and better ways to control or regulate the flow of fluids for all operating conditions.

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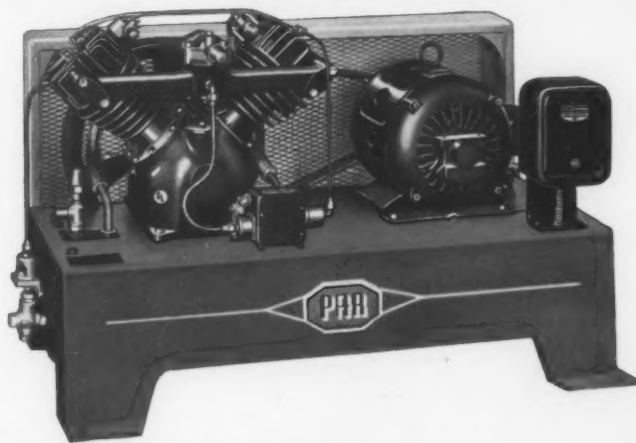
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You'll quickly see **WHY** that...
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COMPARE Par from every angle—
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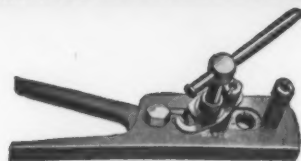


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see you in Cleveland OCT. 29 - NOV. 1, 1946



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THE *Refrigeration* INDUSTRY

VOLUME 3, No. 9

SEPTEMBER, 1946

THIS MAGAZINE has no official affiliation with ANY group, society or association.

THE COVER . . . Modern super markets like this one offer a wide field of profit opportunities for the refrigeration and air conditioning contractors equipped to handle the varied applications of cooling equipment involved. (See story on page 40.)

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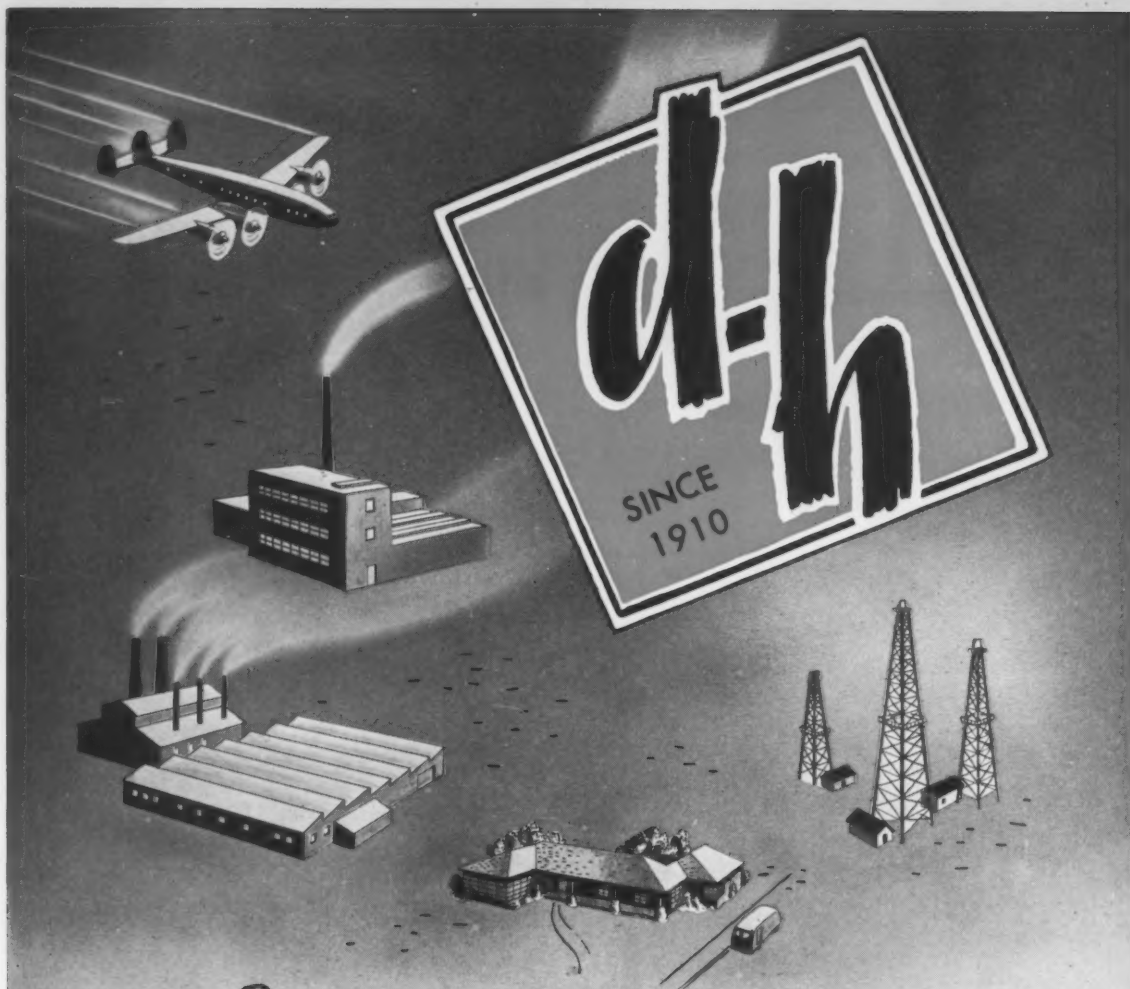
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The good name, of which *dh* is the symbol, has been achieved by courageous and aggressive application of a thorough understanding of heat transmission.

dh enjoys the preference of those who use better heat transmission equipment (*apparatus to control or utilize one or all of the effects of heat conduction, conveyance, convection or radiation*) as applied in the air conditioning and refrigeration fields and in the aircraft, petroleum, food processing and chemical industries.

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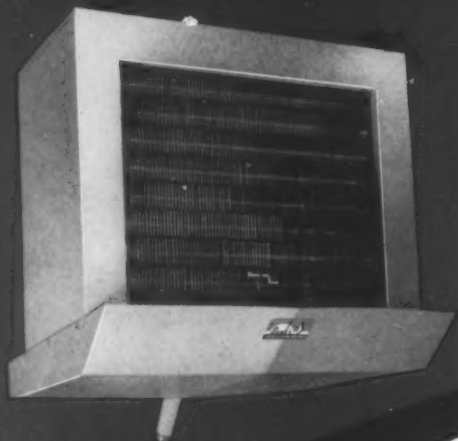
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for designers of
new equipment.

BELTS

FOR REPLACEMENT SERVICE



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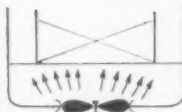


**WATER DEFOST
UNIT COOLER**

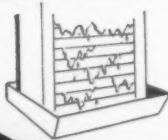
ARE THE MOST
ECONOMICAL



**SLOTTED
HANGERS**
Permit greater
ease of instal-
lation. Slip un-
der lag bolts
while other end
is fastened.



**DEEP
PLENUM
CHAMBER**
Designed to
give maximum
distribution of
moving air
through core.



**DEFROSTS
WITH TAP
WATER.**
Less than five
minutes
needed for
complete de-
frothing.



**MOTOR
SUPPORT**
Light — yet
strong and vi-
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Assures
smooth, quiet
operation.



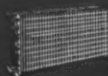
BUSH Units, on their performance record, are the most economical . . . dollar for dollar . . . that can be specified. These units are constructed sturdily with materials of highest quality to stand hard usage beyond the exacting demands of any refrigeration system. BUSH Units stand the test of time with an enviable record of dependable and trouble-free performance.

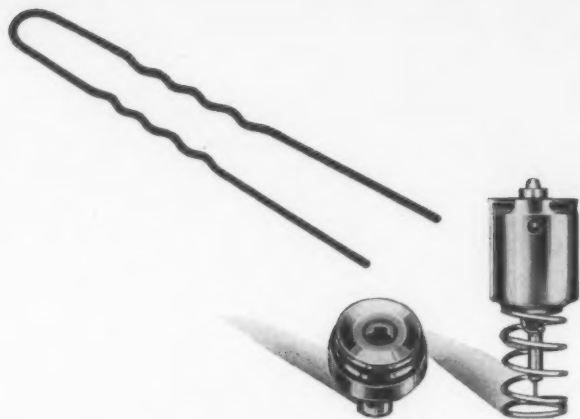
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HEAT TRANSFER PRODUCTS



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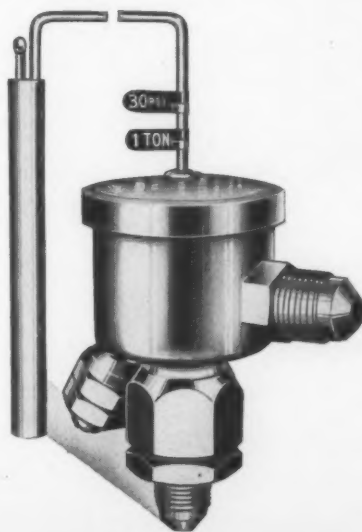
INTERCHANGEABLE

THE NEW ALCO THERMO-LIMIT VALVE

20 combinations of capacity and pressure-limit—all in one compact control! Both cage assembly and pressure-limiting cartridge are quickly interchangeable in the field. That means fewer valves to carry in stock and to the job—a big saving in time and trouble.

The ALCO THERMO-LIMIT VALVE is a "safety" valve that limits pressure to prevent motor overload. It is liquid charged for positive control in any location and position.

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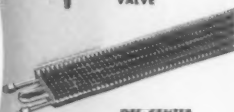
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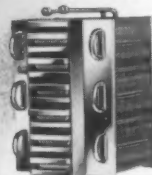
FIN COIL



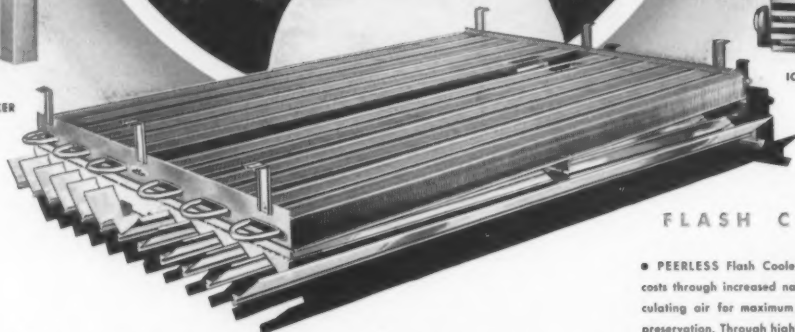
EXPANSION
VALVE



OFF CENTER
COIL



ICE CUBE MAKER



FLASH COOLER

● One week delivery on PEERLESS Flash Coolers! That's a dream come true, made possible by the speed and thoroughness of our reconversion program. It's not only true of Flash Coolers, but also of Ice Cube Makers and Fin Coils. Better still, PEERLESS can now give immediate delivery on Expansion Valves and Capacity Boosters.

These products are all engineered to give the superior service which will make your installations make more customers for you. Think of PEERLESS and fast delivery when you need products in the refrigeration field.

SOLD THROUGH LEADING REFRIGERATION SUPPLY WHOLESALERS

PEERLESS of AMERICA, Inc.
333 N. Michigan Ave. Chicago 1, Illinois, U.S.A.



● PEERLESS Flash Coolers reduce operating costs through increased natural convection, circulating air for maximum efficiency in food preservation. Through highly polished aluminum louvers a constant volume of high-humidity air drifts gently downward over stored products. Completely non-ferrous, having aluminum pans, hangers, fins, end plates, and electro tin-plated copper tubing, the PEERLESS Flash Cooler is a complete unit, quickly and easily installed.

CENTURY Type SCH Air Conditioning Motors

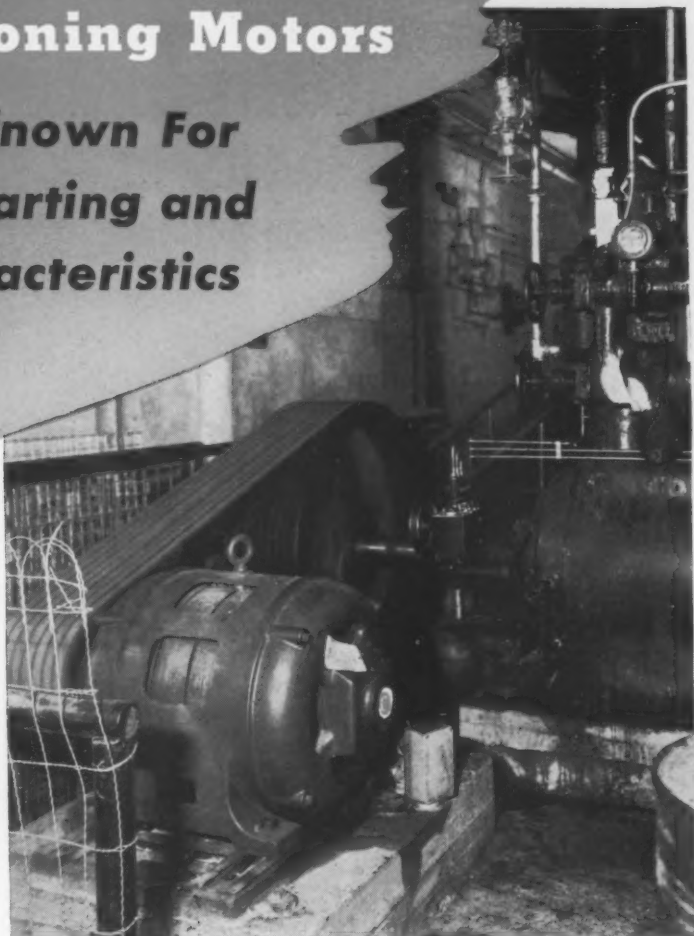
**Are Widely Known For
Their Quiet Starting and
Running Characteristics**

Century Type SCH squirrel cage, polyphase, high torque motors are the ideal power supply for refrigeration compressors because they have the ability to start heavy loads with low starting current.

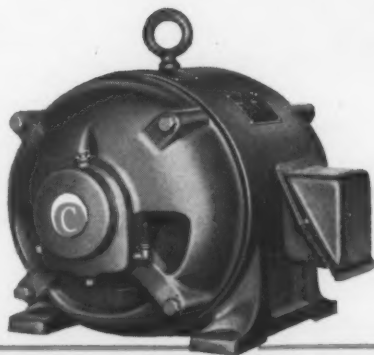
In addition, Century motors are widely known for their ability to start and run smoothly and quietly, are unusually free from vibration, and are ruggedly built for long satisfactory service.

Many types of Century motors for refrigeration compressors, pumps, blowers, fans, unit heaters, and any other heating, cooling, or ventilating applications are made in a wide range of types and sizes from 1/20 to 600 horsepower, for single and polyphase alternating current and direct current.

When you are considering the specifications for — or the purchase of — electric motors, investigate the advantages offered by Century.



75 horsepower Century SCH motor driving a refrigeration compressor in an ice cream plant.



461

CENTURY ELECTRIC COMPANY, 1806 Pine St., St. Louis 3, Mo.
Offices and Stock Points in Principal Cities

She Takes a "Last Look"...

**to Give Added Protection to
Air Conditioning and Refrigerating Equipment**



Because the purity of "Freon" safe refrigerants helps increase both the operating efficiency and the life of the systems in which they are used . . . cylinders and drums of "Freon" are given final tests—a "last look"—before they are approved for shipment.

To guard equipment against the risk of corrosion . . . or the freezing of minute capillary tubes, valves and other delicate parts of modern, compact machines, every precaution is taken to insure the absolute freedom

of "Freon" from harmful impurities.

Throughout the intricate manufacturing process . . . and to meet rigid specifications . . . many plant and laboratory tests are made to control the production of "Freon." These prove "Freon" is free from acids . . . free from impurities . . . and almost totally free from moisture (less than 25 parts in a million parts of "Freon"). They prove "Freon" has an extremely narrow boiling point range, a low volume of insoluble gases and, in addi-

tion, is non-toxic, non-flammable and non-explosive.

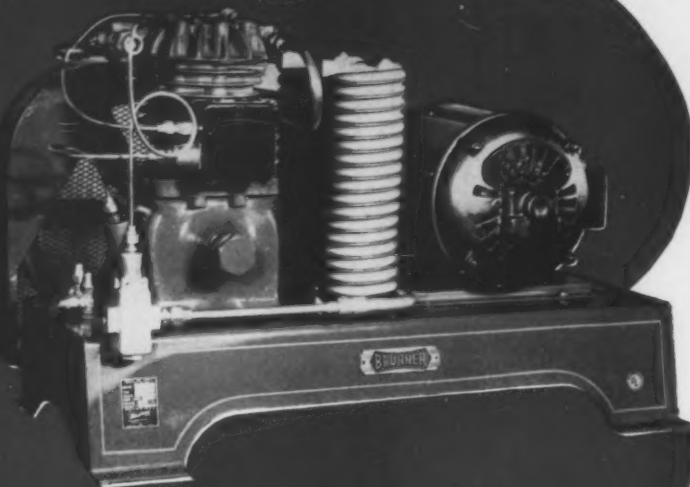
These important characteristics of "Freon" are well understood by refrigerating engineers serving every field. They explain why equipment designed to use "Freon" is so often recommended. Free consulting service is offered by our Engineering Department on any problems concerning the use of "Freon" refrigerants. Address: Kinetic Chemicals, Inc., Tenth and Market Sts., Wilmington, Del.

IMPORTANT FEATURES OF "FREON" SAFE REFRIGERANTS

1. Freedom from moisture...less than 25 parts per million.
2. Narrow boiling point range—confined within limits of $1/2^{\circ}\text{C}$.
3. Less than 2% of insoluble gases in vapor phase.
4. Freedom from acids. There are none in "Freon."
5. Freedom from impurities...less than $1/20$ of 1%.

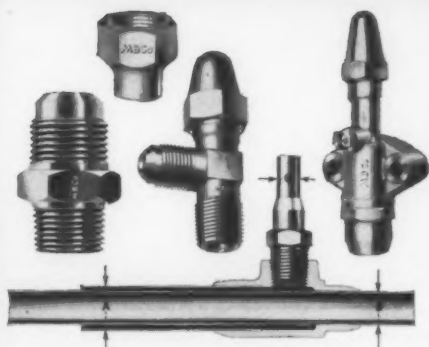


BRUNNER
USES
MUELLER BRASS CO.
PARTS IN THEIR
CONDENSING
UNITS



BRUNNER MANUFACTURING COMPANY

General Offices and Factory: Ullica 1, New York



**BUILT-IN QUALITY . . .
 TIME-TESTED PERFORMANCE**

Mueller Brass Co. Valves, Fittings and Accessories for mechanical refrigeration have a well-earned reputation for built-in quality and time-tested performance. They are manufactured specifically for mechanical refrigeration work. THEY ARE USED BY ALL OF THE LARGEST MANUFACTURERS THROUGHOUT THE UNITED STATES. Mueller Brass Co. products must be good!

**THESE PRODUCTS
 MUST BE GOOD!**

No name in refrigeration is more highly respected than Brunner. In fact, the name Brunner on a condensing unit is symbolic of the highest standards of manufacture measured in terms of materials used, precision assembly and technical developments. For example, valves, coils, bearings and other fittings are of brass or bronze—nothing short of the finest metal for any specific part would do. This accounts for the additional fact that Brunner maintenance and replacement parts costs are negligible—that Brunner units render continuous service at full ratings for many, many years.

Illustrated on the left hand side of this page, are some of the valves and fittings manufactured by the Mueller Brass Co. of Port Huron, Michigan, that are used in the Condensing Unit shown above.

We, at Mueller Brass Co. are proud of our contributions to the dependability and operating efficiency of Brunner Condensing Units.

MUELLER BRASS CO.
 PORT HURON, MICHIGAN

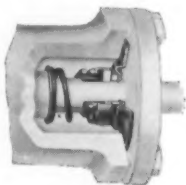
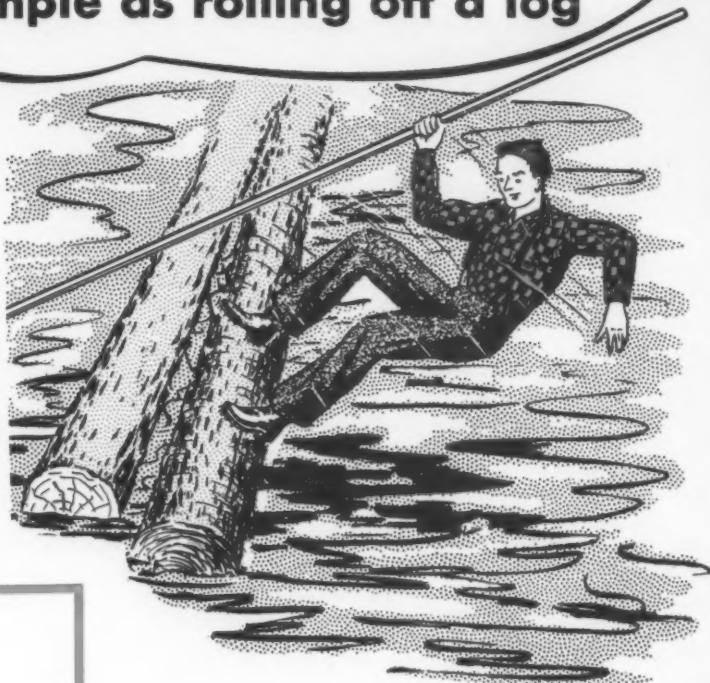
THE ROTARY COP SAYS:



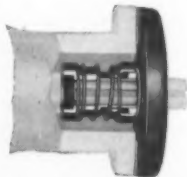
The Construction of
ROTARY SEALS is as
simple as rolling off a log

WEBSTER defines the word Simplicity as follows: "Quality or state of being free from complexity, intricacy or elaborations; — **CONSISTING OF FEW PARTS.**"

The above is a perfect definition of **ROTARY SEALS** which have won world wide recognition for domestic and commercial service. **ROTARY SEALS** are constructed on the principle uppermost in the minds of research engineers—**THE FEWER WORKING PARTS, THE LESS DANGER OF TROUBLE.**"



Did you realize that the **ROTARY SEAL** is the most complete for domestic and commercial service being available for over **752** models of refrigerator assemblies?



A lumberjack finds it easy to tumble from a slippery log and a refrigeration service man finds no difficulty in the **INSTALLATION** and **OPERATION** of **ROTARY SEALS**. This simplicity accounts for

- Customers being assured of the best possible repair job
- **ROTARY SEALS** being selected by many manufacturers for original installations
- No re-working of compressor parts being necessary

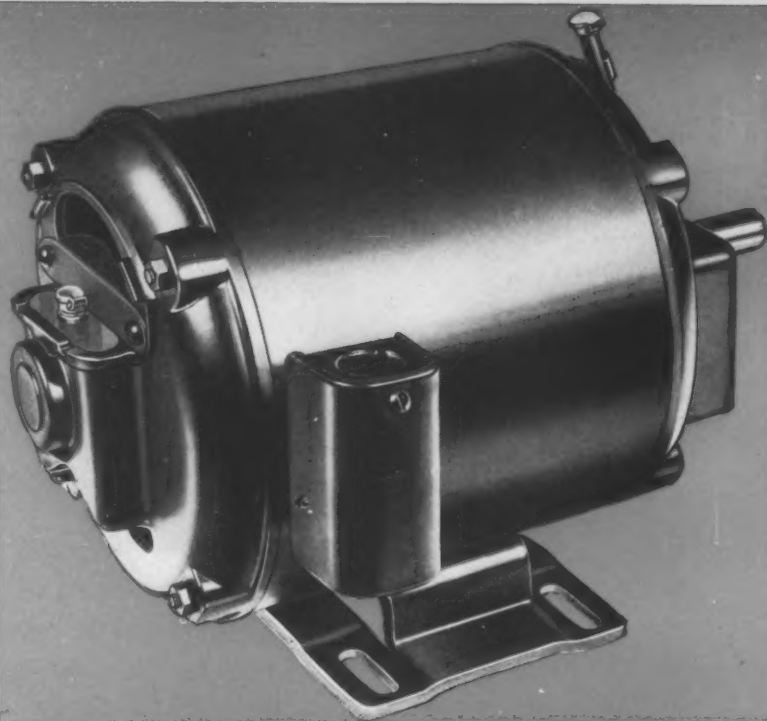


ROTARY SEAL COMPANY

2020 North Larrabee St.

Chicago 14, Ill.

CANADIAN OFFICE: 382 Victoria Ave., Montreal 6, Quebec, Canada



This Two-in-One Motor Handles a Wide Variety of Jobs Efficiently and Economically

The Wagner type RA repulsion-start induction motor is indeed worthy of its reputation as the "general-purpose motor" of the single-phase motor field. Its electrical characteristics combine the best features of two types of motors: the repulsion motor during the starting period, and the induction motor while running at rated operating speeds.

As a repulsion motor, the Wagner type RA motor has a high starting-torque that enables it to start high-inertia loads and accelerate them smoothly. At the same time it requires the lowest starting-current of any type of single-phase motor, and is therefore the least likely to cause light flicker.

As an induction motor, the Wagner type RA motor has a fairly constant and high operating-speed at all operating loads, and a flat efficiency curve over a wide operating range.

This versatile motor is not only exceptionally suited for use on practically every type of motor-driven appliance and machine normally utilizing single-phase current, but is also the *only* choice for a wide variety of applications because of its low upkeep cost, minimum servicing, freedom from vibration and noise, and years of reliable service.

For complete information, write for Bulletin MU-185, and address your request to Wagner Electric Corporation, 6442 Plymouth Avenue, St. Louis 14, Mo.

Consult Wagner Engineers on all Electric Motor Problems

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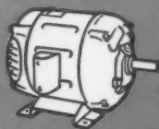
Wagner Electric

**LOCKHEED HYDRAULIC BRAKE PARTS AND
FLUID... NoRoL... CoMaX BRAKE LINING**

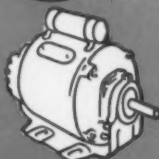
**AIR BRAKES...TACHOGRAPHS...ELECTRIC MO-
TORS...TRANSFORMERS...INDUSTRIAL BRAKES**



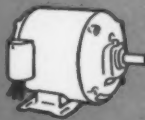
REPULSION-START INDUCTION



REPULSION-INDUCTION



CAPACITOR-START INDUCTION



POLYPHASE



DIRECT-CURRENT



Jewel of rare value

Mills Compression Equipment gleams
brightly on the profit side for you



MILLS INDUSTRIES, INCORPORATED • REFRIGERATION DIVISION

4100 FULLERTON AVENUE • CHICAGO 39, ILLINOIS



HOW IT WORKS



In this cutaway view, the handle has been pulled to open the door. This lowers the trigger (a), made in one piece with the lock (b). A metal plate (c) rests in a notch of the spring-actuated bolt (d) and keeps the trigger cocked.

HOW IT HOLDS

To trip the trigger, close the door. The bolt yields just enough to swing the plate past center. Now it exerts its power horizontally on the catch—a bulldog grip that never eases up.



When it Trips ... it GRIPS

GRAND Rapids Brass Company presents the strongest, most positive automatic trip lock ever devised. Exclusive patented design permits fingertip operation. But once it's closed, there's constant pressure that assures an air-tight, heat-tight seal even against a worn gasket.

Materials and appearance meet the high standards you expect from this company. The

lever is forged brass on a stainless steel pin. The bolt is extruded brass, the casing of special zinc alloy diecast under hydraulic pressure. Finished in mirror-like chrome.

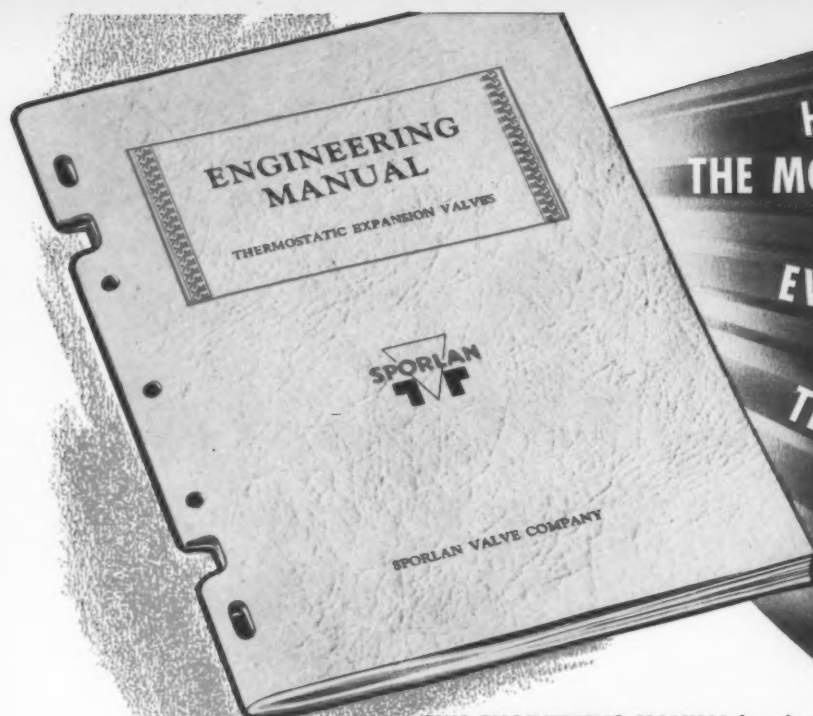
This lock is available for all commercial refrigeration applications in 3 sizes, with adjustable strikes that provide a wide range of offsets. Write for descriptive circular giving specifications and prices.

*Manufacturing a full line
of hardware for
commercial refrigeration*

Grand Rapids Brass Company

Makers of Dependable Refrigerator Hardware for over 40 Years

Grand Rapids 1, Michigan



HERE IS
THE MOST COMPLETE
BOOK
EVER WRITTEN
ABOUT
THERMOSTATIC
EXPANSION
VALVES

THIS ENGINEERING MANUAL has been written for the purpose of improving thermostatic expansion valve operation in general, and helping those who sell, install or use expansion valves to better understand them.

The manual is divided into three sections. The first section covers the theory of thermostatic expansion valves and explains how they operate. The second section is a valve selection guide. It provides for quick and positive selection of expansion valves for all applications. It not only gives the types of valves available for a particular application but indicates the best type of thermostatic charge

and the proper port size. Not only are the port sizes indicated for various B. T. U. loads but also for various size compressors and for various size fixtures, boxes or units. The third section of the manual covers all phases of installation, field assembling, inspection and testing of valves and service hints for valves or refrigeration systems which are not operating properly.

Each section is completely indexed so that the manual may be used as a reference book at all times. Its regular use should be extremely helpful and should eliminate all uncertainty from expansion valve selection and operation.



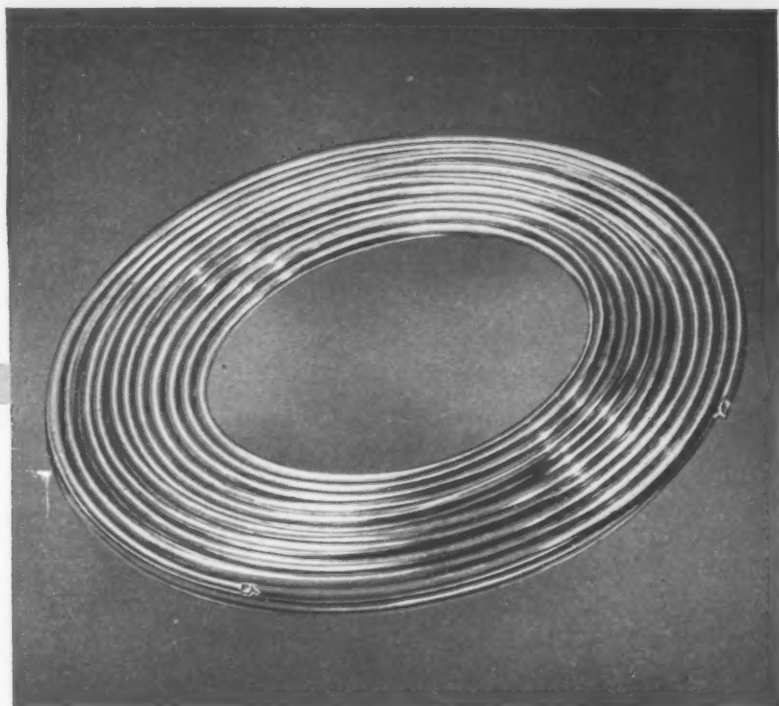
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without this engineering manual.
Order your copy today from your
NEAREST SPORLAN WHOLESALER
or from



SPORLAN VALVE COMPANY

3723 COMMONWEALTH AVE. ST. LOUIS 17, MO.

PROTECT VALVES AGAINST MOISTURE WITH



REVERE DRYSEAL TUBE

An expansion valve is seldom at fault when it "sticks." Moisture is usually to blame. A single drop of water, if frozen in the orifice of a valve, can cut off the flow of refrigerant. Even a fraction of a drop can partially obstruct the flow. And a slightly larger quantity can freeze the needle carrier tight, causing a valve to lose control.

One sure way to protect a system against moisture is to use Revere Dryseal Tube. It is 99.9+% pure copper, dehydrated during production to remove all interior moisture, and comes to you bone dry and sealed at both ends to keep moisture out.

Made for refrigeration, air condi-

tioning, heat control, bottled gas and other exacting services, Revere Dryseal Tube is dead soft for easy handling, and comes in sizes from $\frac{1}{8}$ " to $\frac{3}{4}$ " O.D., with .035" wall. It is standard in 50-foot coils. Sold by Revere Distributors in all parts of the country.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

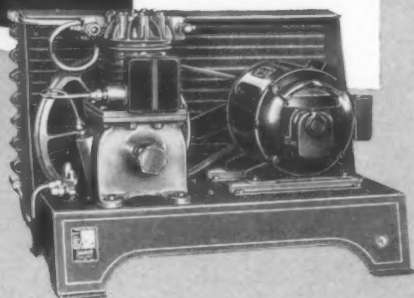
Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities
Distributors Everywhere

Listen to *Exploring the Unknown* on the Mutual Network every Sunday evening, 9 to 9:30 p. m., EDT.

BRUNNER REFRIGERATION HELPS YOU SERVE BETTER



**BRUNNER has not
sacrificed QUALITY
for Volume!**



It is not difficult for us to remember that the scars of war are still with us. Certain necessary materials and equipment are still on the "scarce" list. Volume at Brunner plants is restricted to the number of units that can be manufactured to the fixed high standards that have enabled Brunner Units to establish the records of long service life, dependability and operating economy for which they are noted. From the smallest nut or bolt to the larger size castings there will be no "skimping" in manufacturing time or material quality. By severe shop and service tests, every part built into a Brunner Condensing Unit must prove that it will uphold the Brunner reputation.

Brunner machinery, tools and methods are designed for precision manufacture...operated by skilled, experienced men who pride themselves on their workmanship.

The name "Brunner" on a refrigeration condensing unit signifies that here is a fine piece of equip-

ment...a credit to the judgment of the purchaser in having made the most of his refrigeration equipment investment dollars.

However refrigeration is used in your business it will pay you to study the Brunner Catalog which describes and illustrates the Brunner

line of water cooled condensing units ranging from $\frac{1}{3}$ to 25 hp...air cooled from $\frac{1}{4}$ to 3 hp.

Write for it today.



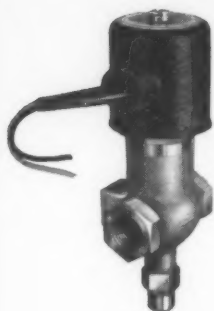
FOR MORE THAN 40 YEARS THE SYMBOL OF QUALITY

BRUNNER MANUFACTURING COMPANY, UTICA 1, N. Y., U. S. A.

POWERFUL
QUIET **DURABLE**

"DETROIT" SOLENOID VALVES

Designed expressly for refrigeration and air conditioning work, "Detroit" Solenoid Valves are the result of many years' experience with such valves.

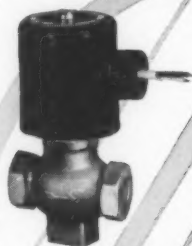


No. 681—The No. 681 is of the pilot operated type and requires a minimum pressure drop of 1 psi to operate the piston.

Nominal capacity—liquid line

7½ tons Freon-12
17 tons Methyl

½" female N.P.T. connections



No. 683-3—This reliable valve, like all "Detroit" Solenoids is designed for use with any fluid that will not attack brass. Furnished with three sizes of orifices, ¼", ⅜", and ½".

Nominal capacity—liquid line

¼" orifice 1½ tons Freon-12

⅜" orifice 3 tons Freon-12

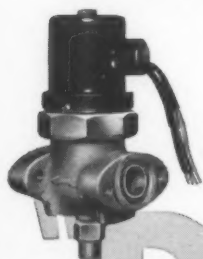
½" orifice 3¾ tons Freon-12

¾" female N.P.T. connections.

2¾ tons Methyl

6½ tons Methyl

8¾ tons Methyl



No. 686—The No. 686 is a heavy duty, large capacity pilot operated valve which requires a pressure drop of 1¾ psi to operate the piston when used with refrigerants, 3 psi on water. It is made with 2 sizes of orifice, ½" and ¾".

Nominal capacity—liquid line

½" orifice 11 tons Freon-12

¾" orifice 17 tons Freon-12

23 tons Methyl

34 tons Methyl

POWERFUL They will lift against high pressures.

QUIET Design of plunger and guide tube minimizes objectionable a-c hum.

DURABLE Moistureproof coils, bodies of non-porous cast brass, long wearing needles and seats give this valve exceptionally long life.

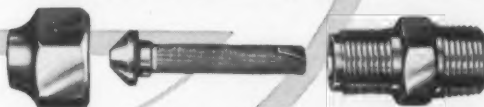
EASILY INSTALLED Substantial mounting boss on valve body provides means for easy rigid installation.

EASILY SERVICED Easily disassembled and cleaned without disconnecting refrigerant lines or wiring.

POSITIVE CLOSING Non-magnetic needle and seat and strong "kick off" spring assure tight closing.

ECONOMICAL Low current demand—replacement parts if required are inexpensive.

FOUR WIRE COIL A four lead coil is available on any "Detroit" Solenoid Valve, for either 115 or 230 volt current according to the way connections are made.



No. 685 STRAINER—Fits any Threaded Solenoid Valve.

Fine mesh strainer of Monel metal to resist corrosion. Slips into adapter tube, and is held in place by tubing and hex nut. Adapter tubes furnished with three sizes of connections to valve, and six sizes of tubing connections:

Adapters with ¼" or ⅜" SAE tubing connections are available with ¾" MPT Valve connections

Adapters with ½" or ⅝" SAE tubing connections are available with ½" MPT Valve connections

Adapters with ¾" or 1" SAE tubing connections are available with ¾" Valve connections

Cleaning or replacing strainer element very easy—just unscrew the hex nut.

DETROIT LUBRICATOR COMPANY



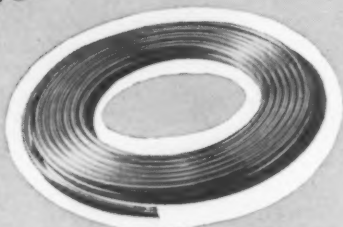
General Offices: 5900 TRUMBULL AVENUE, DETROIT 8, MICHIGAN

Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Canadian Representatives — RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

"Detroit" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • "Detroit" Expansion Valves and Refrigeration Accessories • Stationary and Locomotive Lubricators

When an
Extra Soft
refrigerator
service tube...



comes in an
Extra Handy
package . . .



it's Chase
of course

About the tube —

Chase Copper Refrigerator Service Tube is *extra soft* in temper, for greatest ease of bending and flaring. It's bright annealed and dehydrated—then end-sealed to keep foreign matter out. End seal fits anywhere the tube will fit—need not be removed till the fitting connection is to be made. Tube *stays* clean—need for purging is often eliminated. SIZES: $\frac{1}{8}$ " to $\frac{3}{4}$ " diameters; 50' and 100' lengths.

About the package —

The Chase package gives maximum protection for tube, with minimum package weight...conserves shelf space. Easily readable label gives full specifications. Package can be *reused* to keep cut coils clean—and correctly identified. Ask your parts distributor for Chase Extra Soft Copper Refrigerator Tube in the extra handy package.

For best results, use Chase Copper Tube with . . .

Chase Copper Tube Fittings



Chase Wrought Copper Fittings expand and contract with tube—joints are *permanently* tight. They fit the tube accurately—there are no inside ridges to hamper the refrigerant flow.



Chase
BRASS & COPPER CO.
INCORPORATED

Waterbury 91, Connecticut
SUBSIDIARY OF KENNECOTT COPPER CORPORATION

This is the Chase Network—handiest way to buy brass

ALBANY† ATLANTA† BALTIMORE BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT HOUSTON† INDIANAPOLIS JACKSONVILLE† KANSAS CITY, MO. LOS ANGELES MILWAUKEE
MINNEAPOLIS NEWARK NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE ROCHESTER† SAN FRANCISCO SEATTLE ST. LOUIS WASHINGTON† (†Indicates Sales Office Only)

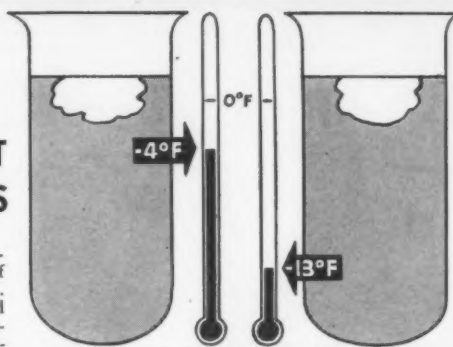
The Ansul Research Staff

CONTINUING REPORT ON:

WAX SEPARATION FACTS

SAME OIL but DIFFERENT SHIPMENTS

An example of wax separation in two samples of presumably the same oil. Both tests were prepared with a 10 per cent concentration of oil in the refrigerant. Sample on the left separated wax at -4° Fahrenheit while the sample on the right did not separate wax until -13° Fahrenheit. In purchasing oils for low temperature refrigeration, specify wax separation temperature.



by the
Ansul
Wax-Oil
Separation
Method

● The temperature at which wax separates from an oil in oil-refrigerant mixture is influenced by three determining factors:

1. The nature of wax in the oil.
2. The amount of wax in the oil.
3. The amount of oil in the oil-refrigerant mixture.

Different oils possess different wax separation characteristics.

The nature and amount of wax content vary in different oils and may even vary in different samples of supposedly the same oil taken from different shipments.

These inconsistencies confuse the engineer in his

efforts to select or recommend suitable lubrication for low temperature refrigerating systems and, to alleviate this condition, Ansul Chemical Co. is ready and anxious, at all times, to co-operate with refrigeration engineers and refrigeration service engineers.

REMEDIES

To eliminate wax trouble in expansion valves and coils:

1. Use an oil which separates little or no wax from its mixture with the refrigerant at the operating temperature of the valve.
2. Install an oil trap to cut down the amount of oil (and consequent wax) circulating with the refrigerant.

SEND FOR THIS BULLETIN

An informative reprint, "The Separation of Wax from Oil-Refrigerant Mixtures," will be sent on request. No obligation... just address...

*REG. U.S. PAT. OFF.



ANSUL WHOLESALERS are ready and equipped to render an intelligent, co-operative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

FOR EXAMPLE:

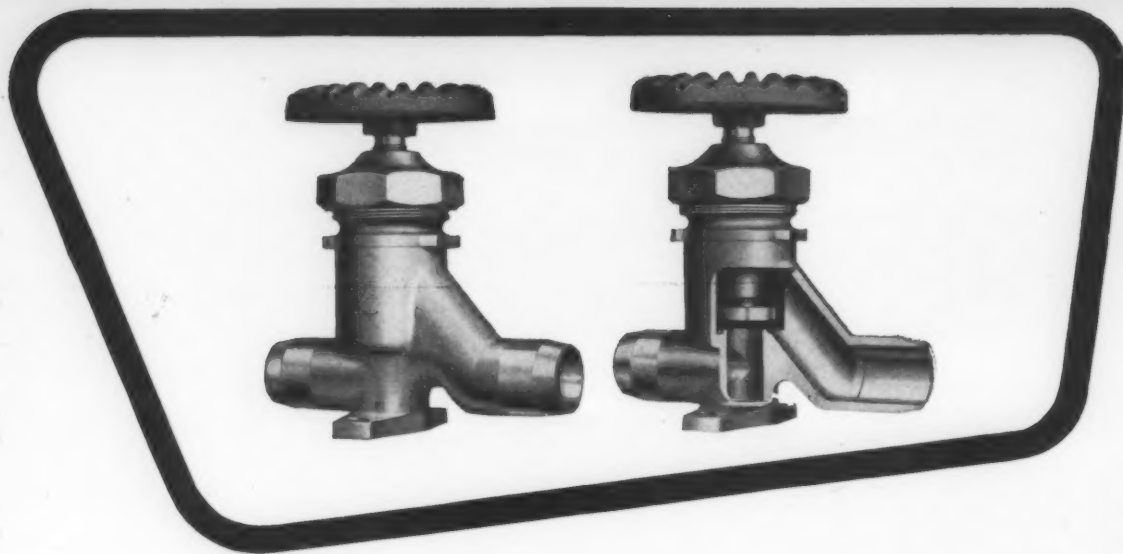
Samples of ice machine oils, submitted by users of Ansul Refrigerants to Ansul Wholesalers, are tested by Ansul laboratories without charge by the Ansul Standard Wax-Oil Separation Method. This approved method, developed and standardized especially for use in connection with oils used in refrigerating systems, provides an accurate determination of the amount of wax which separates from an oil at low temperatures.

ANSUL REFRIGERANTS ARE AVAILABLE AT LEADING WHOLESALERS EVERYWHERE

ANSUL CHEMICAL COMPANY

REFRIGERATION DIVISION, MARINETTE, WISCONSIN

DISTRIBUTORS FOR KINETIC'S "FREON-11," "FREON-12," "FREON-21," "FREON-22" AND "FREON-113"



AN *Extension* OF *Sizes*
 NOW INCLUDED IN OUR LINE OF
 TRIPL-SEAL DIAPHRAGM VALVES

These valves incorporate all the advantageous features of our famous TRIPL-SEAL Diaphragm Valves.

HERE ARE SOME OF THEM

Because of the small amount of movement, the multiple diaphragm in TRIPL-SEAL Valve is never deflected past its normal center; thus immeasurably prolonging both its life and the life of the valve in service.

The multiple diaphragm has approximately 20% increased surface area over more conventional types of diaphragms. A single turn only is necessary to open or close the TRIPL-SEAL Valve.

TRIPL-SEAL

Positive sealing at three essential points in the valve is adequately provided for—a back seat with valve in open position,—the multiple diaphragms,—and a packing around the stem. (This packing insures constant seal between pressure lines and diaphragm chamber.)

The stem of the TRIPL-SEAL Valve is provided with a sixty degree bevel, thus procuring the most desirable wedging action for positive and easy closing. It is manufactured from Tuf-Stuf, a strong, corrosion-resistant alloy.

The stem does not rotate, and is constantly guided into the same position against the seat by a cylindrical guide, so processed as to eliminate any possibility of distortion.

The body and cap of the valve are forged brass to eliminate seepage and to withstand frost action; mounting lugs are forged integrally with the body to provide the ultimate in mounting strength.

The hand-wheel is exceptionally strong, and is so designed that it provides a convenient grip for manual operation.

Valves are furnished in a wide range of styles and sizes.

Order from your jobber.

MUELLER BRASS CO.
 PORT HURON, MICHIGAN

**TO SERVE YOU BETTER
MARLO ADDS
18,600 SQUARE FEET**



**MARLO
HEAT TRANSFER SURFACE**

Ball-Bonded Blast Coils — Cooling and Heating • Air Conditioning and Refrigeration Apparatus • Industrial Blower Units • Unit Coolers • Evaporative Condensers and Coolers • Low Temperature Apparatus

SEE OUR NEW LINE IN CLEVELAND

For the fourth time in 13 years, the ever-growing demand for our products has required us to increase our facilities from 5,000 square feet in 1933, to a total of 42,600 square feet today.

Again we say "Thanks!" to those whose acceptance of our many products made this steady growth possible. We pledge our best efforts to continue producing the best in Heat Transfer Equipment of all kinds.

MARLO = HEAT^TTRANSFER

MARLO COIL COMPANY

ST. LOUIS 10, MISSOURI



Object For Today . . .

**the best control
that can be built!**

Yes, and every day! For, here at PENN our object is always better controls.

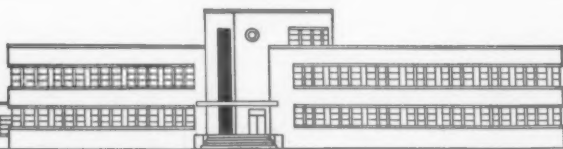
Every PENN worker . . . every inspector and Quality Control engineer . . . intend that you will receive the best their efforts can produce. Consequently, they are supercritical in their insistence that every PENN Control measures up to rigid specifications.

Here, for instance, you see an expert PENN inspector . . . trained to find fault . . . to make sure that PENN Controls are "right." He employs a visual gauge to check carefully the critical dimensions of a screw machine part

used in PENN Automatic Controls.

This extreme care and vigilance are practiced throughout PENN'S modern factory . . . in design, manufacture and inspection. This fact is your assurance of *the best automatic refrigeration controls that can be built*. Ask your jobber about PENN Controls today. They are built for temperatures as low as -150°F. , and for pressures as low as 28" vacuum. *And you never pay a premium for PENN'S extra value.* Penn Electric Switch Co., Gosben, Ind. Export Division: 13 E. 40th Street, New York 16, U.S.A. In Canada: Penn Controls, Ltd., Toronto, Ont.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

RTU

News • Laws • Trends

● **Markets Are a Market.** In a study jointly sponsored by the National Association of Retail Grocers and *The Saturday Evening Post*, 67.7 per cent of the 1,261 independent grocers covered reported they were planning to remodel, and nearly half of those reporting said they were planning to switch to either part or complete self-service. Self-service, in any extent, means considerably wider use of refrigeration equipment. Alert commercial refrigeration men will keep in touch with the better independent grocers in their territories, for here is an important market for refrigeration.

The study also showed that, while 47% of the grocers now sell quick-frozen vegetables, an additional 21.5% will add this merchandise soon. Here is another market for extra refrigeration equipment.

● **Motor Orders Duplicated?** Although deliveries of fractional horsepower motors are 18 months to two years behind orders, it may not take that long to fill the backlog, executives of the industry think. They believe many orders on their collective books are "duplicates", and that once the demand is met by one source the extras on the books of other motor makers will be cancelled. Production of motors in the last half of 1946 will be at least 30% higher than in the first six months of the year, motor industry leaders assert.

● **This Is Really "Cold Turkey."** Maxon Food Systems, Inc. has developed something to go along with the frozen French fried potatoes it introduced earlier this year—it's sliced turkey and dressing with gravy, and it's a frozen food, too. Test marketing has been completed, and the new food item is being made generally available to housewives through stores selling frozen foods. Two sizes of packages are available: a 10-ounce package for homes and a 2¼-pound package for hotels, hospitals, clubs and the like. The home-use package contains two servings—and the food is ready for eating after 25 minutes' cooking in a 400 F. oven. Sounds good, doesn't it?

● **Refrigeration and Production.** Another example of the part mechanical refrigeration plays in the construction industry is the improvement it has made in various types of tools.

Drills subjected to cold treatment can cut more than 250 holes without being resharpened, compared to a maximum of 40 to 50 holes with drills not cold treated. Saws and other cutting tools used in construction work

have a longer life if the metal in them has been treated in sub-zero temperatures.

Cold treated rivets provide greater strength and durability than those which receive only heat treatment.

Through the simple process of circulating refrigerated water over welding tips, welders can make as high as 800 welds with one tip compared to a maximum of 30 or 40 welds with an uncooled welding tip, another advantage made possible by mechanical refrigeration.

● **Cold Water Coming Up.** Production of mechanically refrigerated water coolers is being doubled over pre-war levels to meet the growing demand from all parts of the world for modern drinking water facilities in offices, factories, schools, theaters and other public places.

To keep pace with the demand, members of the water cooler section of the Refrigeration Equipment Manufacturers Association estimated that water cooler production will have to be boosted to more than 100,000 units a year, compared to a pre-war output of approximately 50,000 annually.

There'll Be Room. No one who comes to Cleveland for the All-Industry Refrigeration and Air Conditioning Exposition in October will be turned down on hotel accommodations, the management committee for the Show declares. Downtown Cleveland hotels have allotted to the Show more than 400 rooms beyond the number they originally agreed to reserve.

To handle last-minute reservations, the Cleveland convention bureau has set up a Housing Bureau which will cooperate with the hotels in taking care of all reservations. During the Show, special housing desks will be set up in downtown hotels to assist those who need hotel space.

● **Refrigeration Manual for Veterans.** "Establishing and Operating a Business in the Air Conditioning and Refrigeration Field" is the title of a manual prepared for veterans who desire to enter this phase of the industry. Compiled by V. C. Kylberg, the manual covers all branches of the refrigeration and air conditioning field. Copies may be obtained for 35 cents from district offices of the U. S. Department of Commerce, located throughout the country, or from the Government Printing Office, Washington, D. C.

● **Frozen Food Legislation.** Nationwide sentiment is running high on the desire for frozen food legislation, field representatives and members of Frozen Food Institute reported at a recent meeting in New York City. In answer to a direct question as to whether the frozen food industry should be governed by regulation covering standardization of grades, more than 83% said "yes". This reverses a survey on the same subject conducted eight months previously.

Consumer groups, health boards and state bureaus of weights and measures reportedly have been instrumental in pushing for the legislation, and several states are said to be considering the introduction of regulatory measures on frozen foods at their next legislative sessions.



Installation of Anemostat air diffusers resulted in reduced chilling time and shrinkage, and elimination of odors, in the carcass chilling room of this Chicago packing plant.

AIR DISTRIBUTION in *Food Processing*

How scientific air diffusion is being applied to the preparation, chilling, freezing, and storage processes in meat packing and frozen food industries

By V. Floyd Self

Manager, Food Refrigeration Division,
Anemostat Corp. of America

MODERN air-distributing techniques are playing an increasingly important role in refrigeration methods being applied to the meat packing and frozen food industries. Evidence of this fact is the close attention paid to air diffusion at various plants where alterations have been made to old refrigerating systems, or where new systems have been installed.

An examination of the four principal processes of the meat packing and frozen food industries—preparing, chilling, freezing, and holding—

clearly indicate the importance of proper air distributing methods and the need for scientifically designed air diffusers.

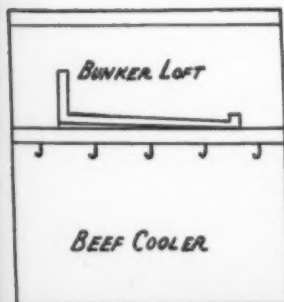
Products arriving at a meat packing house or freezing plant are usually in their natural state or in some state developed by pre-processing, such as cooking. Being at atmospheric temperature or above, the

product is usually placed in a refrigerated preparation room.

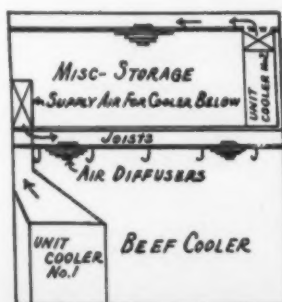
Temperature in this room is held relatively low—38 to 48 F—to arrest deterioration from bacterial and enzymatic activity. This temperature should insure, as nearly as possible, the product's natural state and inherent qualities.

Because food products have con-

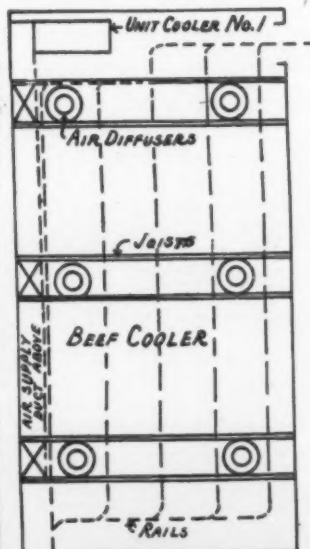
A typical method of saving space by changing a bunker-loft installation to a unit cooler system equipped with Anemostats. Floor space was increased 92%.



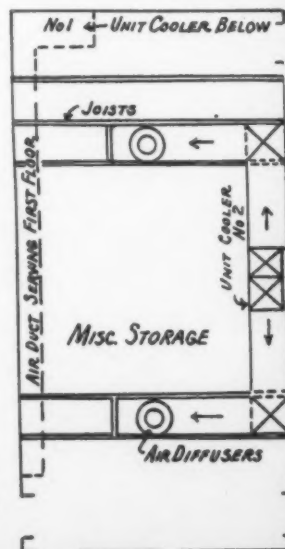
BUNKER LOFT (BEFORE)



BUNKER LOFT (AFTER)



FIRST FLOOR PLAN



SECOND FLOOR PLAN

siderable moisture content, their dehydration must be held at a minimum. Drafts, therefore, must be eliminated as they accelerate dehydration and result in unequal temperature and humidity throughout the preparation room. Drafts also create uncomfortable working conditions which greatly lower the efficiency of workers in the room.

Temperature of the product should be reduced to as near its freezing point as is consistent with other considerations, such as dehydration, efficiency in preparation, handling, and workers' comfort and efficiency. Scientific air diffusers make this possible by equalizing temperature and humidity throughout the room, by eliminating drafts, and by preventing air stratification and stagnant air pockets.

Chilling Practices

When the product leaves the preparation room, it is transferred to the chilling room. Temperature in this room should be no higher than in the preparation room and, again, preferably as near the freezing point of the product as practical.

Chilling room temperatures usually range from 35 to 45 F, depending upon the products and other circumstances. If the chilling room temperature is higher than that of the preparation room, deteriorating processes will be reactivated.

The chilling phase should be thorough and all excess heat should be removed from the product to minimize heat-removal in the freezing process.

Additional product preparation, if required, is done in the chilling room. Where practical, products should be stored so as to permit circulated air to completely envelope each item. But even where this is done, low-velocity air of controlled temperature and humidity should be evenly distributed about each piece of the product. Only scientific air diffusion can accomplish this with maximum efficiency.

Product Freezing

Following the chilling stage, the product enters the freezing room. Because temperature equalization is highly essential in this process, proper air diffusion will greatly improve it.

Time required to freeze a product is

relatively important, and tests indicate that freezing can best be accomplished in the shortest time by using high velocity air at sub-zero temperatures.

Limited available records do not reveal whether or not the high velocity shortens the freezing time, but it is reasonable to assume that high velocity contributes to the cooling effect mainly by increasing evaporation of the product's excess moisture content. However, excessive dehydration, however, reduces the product's weight and alters its appearance. Therefore, the high velocity air motion should be regulated to as not to accelerate dehydration.

Regulation of air motion is a primary requisite of proper air distribution. Therefore, correct air distribution will completely equilibrate conditions around the product so that freezing time is reduced to a minimum, without detrimental dehydration.

Holding the Product

Following the quick-freezing process, the product is transferred to the holding room. Temperature is continued relatively low in this room because the product, when leaving the freezer, may be only surface-frozen and not completely frozen to its core. In such cases freezing is completed in the holding room.

Temperature in this room must be maintained at an almost constant level, and air stratification and stagnant air pockets must be avoided. Otherwise temperature of the product may be raised to a dangerous or

damaging point. Subsequent re-freezing would then be necessary, and that would only add to the damage.

A high relative humidity should be maintained in this room, and temperature and humidity should be closely equilized throughout the area.

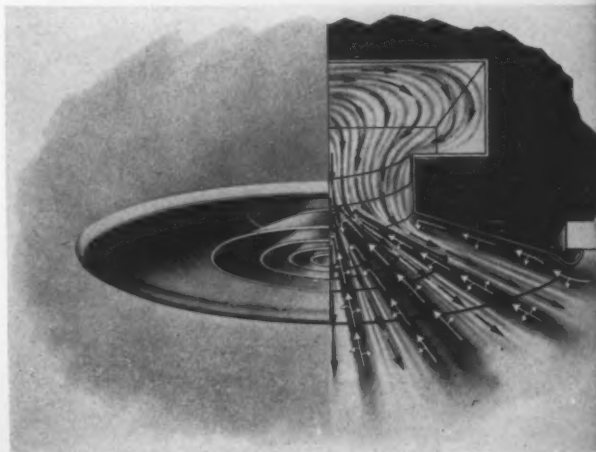
These exacting refrigeration requirements of a holding room are best met by distributing air through

Continued on page 51



Problem of chilling and holding large and small products in the same room is solved by installation of Anemostats. Quickly chilled small products are held without appreciable shrinkage while larger products are chilling. Temperature variance is $\frac{1}{2}$ F.

Scientific design of the Anemostat draftless air diffuser causes room air (white arrows) to be siphoned into the device by air (black arrows) leaving the duct. These two streams of air thus are pre-mixed within the diffuser before recirculation.



HIT 'EM WHILE THEY'RE

Hot

PURCHASE A NEW REFRIGERATOR


SPECIAL OFFER

We purchase your old refrigerator, recondition it, and return it to you without charge. You can then use it without charge until we are able to supply you with one of the finest refrigerators.

**YOURS REPAIRED
WITHOUT ANY COST!**

ABC Appliance Service

4812 NO. BROAD ST.
Open Evenings 'til 9
Phone Gladstone 9587



Household refrigerators are still tough to get . . . so here's how to keep your prospects from becoming somebody else's customers.

MANY a household refrigerator dealer, in these days of restricted manufacture and uncertain delivery, is searching for a way to keep his hot prospects from becoming the customers of his competitor down the street who might receive a shipment of new units a couple of weeks before he does.

Chris Doernbach, owner of ABC Appliance Service, Serrel dealership well out on Philadelphia's North Broad Street, was in the same boat. More than once he had lost what

seemed like sure sales simply because the potential customer found a place where he could get a new refrigerator of some other make a little while before Mr. Doernbach could promise delivery.

Many people who want new household refrigerators today, he found, want them so badly that they'll grab the first one they can get their hands on, regardless of make, model, or size. And, he reasoned, something had to be done to protect himself against the inroads of other dealers

with more fortunate quota allowances and earlier delivery schedules.

After due deliberation, Mr. Doernbach hit upon a plan which seems to solve this problem pretty well. It not only enables him to nail down a prospect while he's in a buying mood, but it also commits this prospect to buy his new refrigerator from ABC organization, and to wait until this store is able to deliver the unit. And what's most important, it keeps the potential customer happy in the meantime.

Chris Doernbach (right), owner of ABC Appliance Service, shows a potential customer where to sign "the dotted line." (Photographer's note: The prospect took the hint!)



In this completely equipped shop in the store's basement ABC service men recondition the used refrigerators which are purchased from customers who order new refrigerators.

Does all this sound too good to be true? Well, it isn't, for here's how the plan works.

When a prospect walks into the ABC store and asks about a new refrigerator, Mr. Doernbach launches into the usual sales talk concerning the merits of his product, and then explains that it may be a matter of several weeks or even months before he can assure delivery of a new unit.

Usually the prospect's enthusiasm begins to wane a little at this point, but this merely gives Mr. Doernbach his chance to put his carefully prepared plan into operation.

"Do you have a refrigerator now?" he asks. And almost invariably, he finds the answer is "yes but it's not working very well." All of which gives Mr. Doernbach his perfect opening. "Well then," he continues, "what you're primarily interested in is not a new refrigerator, but adequate refrigeration facilities for your home. Right?"

The 'Sunday Punch'

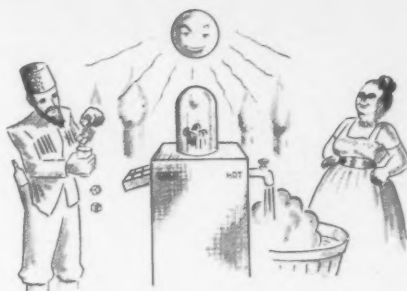
As the prospect nods agreement, Mr. Doernbach goes on, "OK, here's what we'll do for you. We'll buy your present refrigerator from you right now. We'll pay you a cash price based on the 'Blue Book' figure for that particular model. We'll pick up that refrigerator, bring it into our shop, completely recondition it, and then re-install it in your home for use until we can deliver your new refrigerator to you. And all this without a penny of cost to you.

"And furthermore, while your refrigerator is being overhauled we'll provide you with a 'loaner' so that you will not be without refrigeration at any time. All you have to do to clinch this deal is to sign this contract agreeing to buy your new refrigerator from us, when we are able to deliver it and at the price existing on that date."

Mr. Doernbach finishes his sales talk and winds up with his pet punch line: "Well, that's the story . . . what have you got to lose?" And that's really the "\$64 question," for it invariably leaves the prospect without any comeback but "Where do I sign?" At which, of course, Mr. Doernbach promptly shows them.

The deal actually involves three separate transactions:

(1) Mr. Doernbach contracts to buy the prospect's old refrigerator,



Some like it hot...

HOT WATER and artificial ice from the same unit? That may sound like "Rube Goldberg" stuff to you, but according to the claims of the Russian Research News published by the American Russian Institute this phenomenon is entirely possible with the solar refrigerator.

One of the most novel application of solar energy yet developed, this unit is said to be capable of maintaining sub-zero temperatures even though outside heat may be 98 F. in the shade.

This unique refrigerating appliance consists of a solar boiler of the type developed by Federico Molero, a Spanish scientist now in the Soviet Union, combined with an absorption refrigerator having no moving parts except a small pump to keep the ammonia in circulation through a series of hermetically sealed condensing chambers.

pays for it at the established price, and the prospect then signs a receipt for the money.

(2) Mr. Doernbach sells the prospect a new refrigerator, with the agreement that the price is to be the established selling price at the time of delivery.

(3) Mr. Doernbach leases back to the customer the used refrigerator which he purchased in the first transaction.

Actually the provisions for reconditioning the old box and leasing it back to the customer are incorporated right in the new equipment contract, so the customer has to sign only this one document in addition to the receipt for the money received for his old refrigerator.

This contract stipulates that if the customer should default and fail to buy the new refrigerator as called for in the agreement, the store retains possession of the used unit which it has purchased and reconditioned, and the defaulting customer pays \$5 per

month rental for the time this reconditioned refrigerator has been used.

As new units are delivered, the store keeps the reconditioned ones to use as replacements for others which are being reconditioned under this same plan.

If any of the reconditioned units put back in use fail to function properly, these units are serviced by the ABC organization without charge.

All reconditioning is handled in the company's completely equipped service shop located in the basement of the store building, and is personally supervised by William J. Richmond, the firm's service manager.

As Mr. Doernbach explains it, this arrangement really looks like one of those deals wherein nobody stands to lose anything. The customer gets his new refrigerator when it is available, and meanwhile gets guaranteed refrigeration for his home. And Mr. Doernbach, as he sagely points out, winds up with two good refrigerators to sell, instead of only one.

COOLING FOR HUMAN COMFORT

LOAD CALCULATIONS PART I

By S. C. Moncher

Regional Manager
Electric Power Equipment Co.

FUNCTION OF LOAD CALCULATIONS: Before we can select the proper equipment for a given comfort cooling installation, it is first necessary to determine the following data:

(1) The volume, dry-bulb temperature, and wet-bulb temperature of the air which must be supplied to the cooled space in order to offset its heat and moisture gain. These are determined solely by the room sensible and latent heat gains, and are a function of the room sensible heat ratio. Any fresh air which is brought directly to the cooling unit is cooled and dehumidified before entering the room, and, therefore, does not contribute to the heat gain of the room, although constituting a part of the total heat load on which the selection of the refrigeration equipment is based.

(2) The total heat gain for the over-all system, segregated into sensible and latent heat loads. This governs the capacity of the cooling and dehumidifying equipment to be used.

It is the purpose of the load calculations to assemble and tabulate the necessary information on which the determination of the above data is based.

DESIGN CONDITIONS: Design conditions cannot be defined arbitrarily, but must be based on good judgment and experience. In the United States, the heating of indoor areas in the winter-time is con-

THIS series of articles on the fundamentals of comfort cooling is designed to serve two purposes: (1) provide those just entering the air conditioning field with a basic understanding of the factors involved in comfort cooling; and (2) enable the trained air conditioning engineer to discuss comfort cooling applications in a non-technical language that the prospect or the customer can understand.

sidered a necessity. It is customary therefore to install heating equipment of sufficient capacity so that the optimum indoor temperatures may be maintained on even the very coldest days, though these extreme cold days may occur only once every two or three years. In the case of summer comfort cooling, however, indoor and outdoor design conditions are influenced by considerations other than the maintenance of optimum indoor conditions at maximum outdoor conditions. These qualifications are discussed below.

In winter, a temperature difference exceeding 50 F between outdoors

and indoors is not unusual, and an adjustment of the human body to the temperature difference is made by removing outer clothing when entering a building. In summer, however, it is customary to already wear a minimum of clothing outdoors, so that the temperature gradient between indoors and outdoors cannot be too great, if shock is to be avoided. Wherefore, the indoor design effective temperature is usually above the optimum effective temperature as shown on the Comfort Chart.

Also, comfort cooling is still, in many instances, considered a luxury, and many people are hesitant to invest in equipment sufficient to provide maximum comfort for the extreme outdoor conditions which occur but rarely. As a result, summer outdoor design conditions are usually less severe than the maximum temperature and humidity locally encountered.

SUMMER OUTDOOR DESIGN TEMPERATURES: Summer outdoor conditions of temperature and humidity vary greatly in different parts of the world, and usually show marked differences from day to day in a given locality. Also, for any given day, the dry-bulb temperature often shows a change of 15 to 20 degrees from morning to evening, reaching a normal peak between 2 and 4 p.m. The moisture content and, therefore, the dew point temperature of the out-door air will remain

approximately constant (providing, of course that there is no rain).

In comfort cooling installations, it is not customary to provide for the peak conditions of outdoor temperature and humidity which occur only occasionally. In fact, it is practical to ignore the extremes of temperature and humidity which occur less than 5 percent of the time, for the amount of money which would have to be invested in equipment to take care of this peak 5 percent, could hardly bring an adequate return. Outdoor design conditions, therefore usually eliminate peak conditions which occur less than 5 percent of the time, and represent a compromise between the maximum



outdoor conditions and what is considered economically practical.

Recommended outdoor design dry-bulb and wet-bulb temperatures have been tabulated by the American Society of Heating and Ventilating Engineers and various manufacturers of air conditioning equipment. For the northern part of the United States, outdoor design conditions of approximately 95 F drybulb, 75 F wetbulb 40 per cent relative humidity, 67 F dew-point) are considered satisfactory. Representative outdoor design conditions for several of our large cities are given below.

City	Summer Design dry-bulb	Temperature, F wet-bulb
Atlanta, Ga	95	76
Baltimore, Md.	95	78
Boston Mass.	92	75
Charleston, S. C.	95	78
Chicago, Ill.	95	75
Dallas, Texas	100	78
Denver, Colo.	95	64
El Paso, Texas	100	69
Jacksonville, Fla.	95	78
Los Angeles, Calif.	90	70
Minneapolis, Minn.	95	75
New Orleans, La.	95	79
New York, N. Y.	95	75
St. Louis, Mo.	95	78

The probable range of dry-bulb and wet-bulb temperatures between

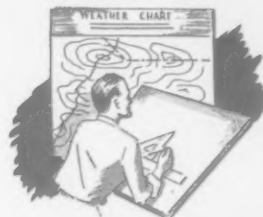
the hours of 8 a.m. and 8 p.m. for several outdoor design conditions is given in Table III.

SUMMER INDOOR DESIGN CONDITIONS: Inasmuch as people are continually going into and out of buildings, especially commercial buildings, it is important to maintain indoor air at such a temperature level that the shock when entering from the outside will be minimized. This correlates indoor design conditions with (1) outdoor design dry-bulb temperature and (2) length of indoor occupancy. Obviously, the shorter the period of occupancy of the cooled space, the less should be the difference between indoor and outdoor design temperatures. Likewise, the higher the outdoor design dry-bulb temperature, the higher should be the indoor dry-bulb design temperature, so that the contrast in temperatures will not be too great in leaving or entering the building.

There are also other considerations which influence indoor design conditions. Custom of the locality is one, people in warmer climates being more acclimated to higher indoor temperatures. Nature of indoor activity is another, people physically active, as in dancing or exercising, preferring lower indoor temperatures than sedentary people. Indoor dress of people is a third obvious consideration, people more formally dressed requiring lower temperatures than people dressed informally.

We have noted that the optimum indoor summer effective temperature as shown on the Comfort Chart (see *June issue, p. 30*) is 71 F. Due to the factors discussed above, how-

ever, it is customary to use indoor design effective temperatures from 1 to 5 degrees above this optimum effective temperature. Table IV gives recommended indoor design effective temperatures for different conditions of (1) outdoor dry-bulb design temperature, (2) length of occupancy, (3) locality, and (4) activity.



A period of one hour is a convenient, although arbitrary, line of demarcation between short and long term occupancy. Any period less than an hour may be considered short term occupancy.

For each effective temperature shown in Table IV, many combinations of dry-bulb temperature and relative humidity are possible. It is customary, however, when feasible, to maintain an indoor relative humidity of approximately 50%. The Comfort Chart shows that at approximately 50% relative humidity the following dry-bulb temperatures will result in effective temperatures between 71 F and 77 F:

(1) 71 F effective temperature—76 F dry-bulb, (2) 72 F effective temperature—78 F dry-bulb, (3) 73 F effective temperature—79 F dry-bulb, (4) 74 F effective temperature—80 F dry-bulb, (5) 75 F effective temperature—82 F dry-bulb, (6) 76

TABLE III

Probable Hourly Range of Outdoor Design Temperatures

Design Temperatures		TIME (Sun Time)							
		8 AM	10 AM	NOON	2 PM	4 PM	6 PM	8 PM	
DB	WB	DB WB	DB WB	DB WB	DB WB	DB WB	DB WB	DB WB	DB WB
90	70	83 68	85 69	89 70	90 70	90 70	88 69	85 69	
95	75	88 73	90 74	93 74	95 75	95 75	93 74	90 74	
95	78	88 76	90 77	93 77	95 78	95 78	93 77	90 77	
100	69	93 67	94 67	98 68	100 69	100 69	98 68	95 68	
100	78	93 76	94 76	98 77	100 78	100 78	98 77	95 76	

F effective temperature—83 F dry-bulb, (7) 77 F effective temperature—84 F dry bulb.

OPERATING CONDITIONS: It should be pointed out here that indoor design conditions are not necessarily indoor operating conditions. Indoor operating effective temperatures should be so controlled that they are correlated with actual existing outdoor dry-bulb temperatures. This is especially true for short term occupancy applications. Table IV may be used as a guide for selecting actual operating temperatures for different outdoor dry-bulb temperatures. Recommended hourly indoor operating temperatures for a 90 F DB-70 F WB day are given below. These are based on maintaining an indoor relative humidity of about 50%.

Time of day	8 a.m.	10 a.m.	Noon	2 p.m.	4 p.m.	6 p.m.	8 p.m.	10 p.m.
Actual outdoor dry-bulb temperature, F	83	85	89	90	90	88	85	82
Indoor operating dry-bulb temperature, F	79	79	80	80	80	80	79	78

DESIGN LOAD: The conditions of outdoor and indoor temperature and humidity on which to base load calculations have been discussed in detail above. It is apparent that outdoor and indoor design conditions cannot arbitrarily be set, but vary with (1) locality, (2) length of occupancy, (3) type of activity, (4) personal preferences, (5) economic considerations, and (6) other factors.

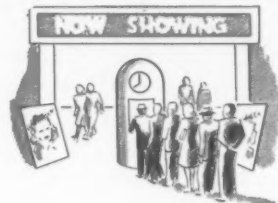
Likewise, the determination of the design load is not an arbitrary mat-

necessary to use the outdoor design temperature in heat conduction calculations, but rather the temperature assumed to exist at the actual hour of peak load (see Table IV). Likewise, the solar radiation gain through glass would be non-existent, the only effect of solar radiation being due to the heat transmission lag through roof and walls. On the other hand, were the peak load to occur in the morning, the effect of solar transmission through roof and walls would be minimized, but the solar transmission through east and south glass would become significant. In late afternoon, of course, the effect of solar heat is usually at its maximum, especially where there is south or west exposed glass area.

It is not always obvious, however, just when the peak load will occur. For example, in the case of an audi-

the load at the various times of the day, in order to determine at which time the load will be at a peak.

PEAK OCCUPANCY: Often, the occupancy load will vary from hour to hour and from day to day. The purchaser of comfort cooling equip-



ment may not be willing to invest the money in the equipment necessary to provide for the maximum occupancy load, if this load occurs only occasionally. For example, let us consider a retail store in which the peak load occurs daily at about 3 p. m., when there is an average of 100 customers and employees in the store. On Saturday afternoons at 3 p. m., however, the average number of customers and employees rises to 150. The owner of the establishment may feel that the few hours of discomfort which might be experienced due to the extra 50 people do not warrant an investment in the additional equipment required.

Then again, if the load calculations are based on, say, a design temperature of 95 DB-75 WB, the

Continued on page 52



ter, but one that also requires the exercise of good judgment. Ordinarily, the load should be calculated for the time of day at which it is at its peak, so that desired indoor conditions may be maintained throughout the day. From an economic point of view, however, it is important to avoid the pyramiding of peaks in calculating loads.

For example, if the peak load occurs after sundown, it would not be

torium with large glass area and an average occupancy of 1000 people in the afternoon and 1500 people in the evening, it will not be apparent off-hand just when the peak load may occur. Likewise, in buildings with constant occupancy and diverse areas of glass at different exposures, it may not be obvious at which time of day the peak load will occur. In these cases, it will be necessary to calculate

TABLE IV

Recommended Summer Indoor Effective Temperatures

Outdoor DB Temp. F.	Indoor Effective Temperature, F.	
	Short Term Occupancy	Long Term Occupancy
80	72	72
85	73	72
90	74	73
95	75	74
100	76	75

Notes: (1) For southern regions of the United States, add one degree to the effective temperatures shown for corresponding outdoor temperatures.

(2) When occupants of the cooled space are unusually active, subtract one degree from the effective temperatures shown for corresponding outdoor temperatures.

You can help solve

THE CYLINDER SHORTAGE

Here are the facts on the refrigerant cylinder situation—and what you can do to help ease it

THE refrigerant cylinder situation is tough. Refrigeration men have had reminders of that all summer long, both from their refrigeration wholesalers and from the representatives of the major refrigerant producers. "Don't hoard cylinders . . . Get them back to the factory as quickly as possible" has been the theme of these reminders.

What sizes of refrigerant cylinders are in shortest supply?

What is the reason for this shortage?

Can some improvement be expected in the near future?

What can you, as an individual refrigeration man, do to improve the situation?

In an effort to obtain an overall view of the refrigerant cylinder picture to present to its readers, **THE REFRIGERATION INDUSTRY** asked these questions of five of the leading producers of refrigerants. Here are their answers:

What size of cylinders are in shortest supply?

"All sizes of cylinders are short," says L. C. McKesson, reporting for *Ansul Chemical Co.* "Small cylinders are in shortest supply."

"The smaller the cylinder size the shorter the supply," reports N. C. Cooper, *Electrochemicals Department, E. I. du Pont de Nemours & Co.*

"We have ample supplies of both methyl chloride and sulfur dioxide, but the supply of cylinders presents a problem," report officials of *Eston Chemicals, Inc.* "We have been able to hold our own fairly well with the larger sizes, but we are still short on the 60 lb. methyl and 100 lb. sulfur."

IN A NUTSHELL

What sizes of refrigerant cylinders are in shortest supply?

Freon: 145 lb. and 25 lb. sizes.

Other refrigerants: Generally speaking, the smaller the cylinder the shorter the supply. But shortages run up to 60 lb. cylinders for methyl chloride, 100 lb. for sulphur dioxide.

What is the reason for this shortage?

Reduced deliveries of smaller sizes by manufacturers of cylinders; to a large extent the result of the recent steel strike. With small cylinders unavailable, service men are forced to buy in larger sizes, beyond their current use requirements. This, in turn, ties up the larger containers for abnormally long periods of time.

How long may this shortage of cylinders be expected to continue?

Some improvement may be expected in some quarters by the end of this year. Refrigerant manufacturers have thousands of cylinders on order, some of which are being delivered now, and this will satisfy part of the demand; but the overall situation may not be much better until early next year or by the beginning of the next refrigeration season.

What can refrigeration men in the field do to help the situation?

Return cylinders to their wholesalers as quickly as possible; don't hoard. Order such quantities of refrigerants as may be expected to be used within the next 30 to 60 days.

"Cylinders in shortest supply are the 145 lb. Freon cylinders, which are the same as the 150 lb. sulfur dioxide cylinders, and the 25 lb. Freon-12 cylinders," reports W. W. Rhodes, sales director of *Kinetic Chemicals, Inc.*

"The whole difficulty centers around the critical shortage of small containers," says R. H. Israel, of *Virginia Smelting Co.* "These are the 5 lb., 10 lb., 20 lb., and 35 lb. cylinders

that servicemen normally use for transporting refrigerant to the job where it is actually transferred to the condensing unit."

What is the reason for this shortage?

Ansul Chemical Co.: "Time in transit is a tremendous factor, as well as the delay in pickup at point of origin. The transit time, coupled with the fact that small service cylinders have not been available, have forced small users to purchase larger drums and they must then hold them for a year or more. Also, more wholesale outlets have been opened, and as a result more drums are needed for stocks."

du Pont Electrochemicals Dept.: "We believe that service organizations retain the smaller size of cylinders for their own use, having them refilled at wholesalers' stores from larger containers."

Eston Chemicals: "Our records indicate that despite the fact that we have obtained a considerable number of new cylinders during the past six months, our actual output of refrigerant has not increased. This is obviously due to a slower turnover."

Kinetic Chemicals, Inc.: "The manufacturers of cylinders are not able to obtain the so-called deep drawing steel because the capacity for making such steel sheets is limited. The steel strike seriously interfered with the shipments of cylinders, and cylinders which were ordered eight months to a year ago are now being delivered."

Virginia Smelting Co.: "Many of the steel manufacturers have reduced deliveries of small sizes, at least as far

as civilian procurement is concerned. Set opposite this statement the fact that a great many returning service men have entered the service field and need small containers in order to conduct their service work. Small containers have become tools of the service business, tools just as essential as a monkey-wrench or a screwdriver. "Each year, we have put thousands of these small containers into the field. Once they leave our plant very few return. We, therefore, are unable to supply the recurring wholesaler demand for these smaller sizes. Since the wholesaler is unable to supply refrigerants in small containers, service men are forced to buy them in large sizes, or in quantities much beyond their current use requirements. This in turn ties up our larger containers for unreasonably long periods of time. This really hurts."

Do you expect the shortage to be improved in the near future?

Ansul: "Yes, the situation will be improved, as we have thousands of cylinders on order, with some of them scheduled for delivery in August, 1946. We have no way of knowing if the new cylinders will satisfy demand, but they will help."

du Pont: "This shortage of cylinders is likely to improve considerably by the end of the year."

Eston: "We have been promised an additional supply of 60 lb. methyl and 100 lb. sulfur sizes in August, and we feel certain we will catch up with our orders at this time. We believe that the general situation should improve markedly in the next 30 days."

Kinetic: "We do not think that the delivery situation can improve much until some time in 1947, but at least one new manufacturer of cylinders has entered the field and there may be an improvement in early 1947."

Virginia: "We do not see the situation relieved or corrected until the first of next year or probably by the beginning of the next refrigeration season."

What can refrigeration men in the field do, on their part, to improve the situation?

Ansul: "About all that can be done
Continued on page 75



Jack Carava demonstrates the ease of refilling cylinders and the visibility of the new system.

Refrigerant Charging-Streamlined

A NEW method of transferring refrigerants from large supply cylinders to small cylinders as used by refrigeration service men has been engineered and installed by the Harry Alter Co., Chicago refrigeration supply jobber.

Supply refrigerant cylinders are stored on the fourth floor and are connected with copper tube lines to the refilling department, located in the city order department on the second floor.

A compact charging panel installed on the second floor contains exhaust equipment to remove any refrigerant fumes escaping during the refilling process.

All refrigerants enter an Imperial refrigerant transfer unit, hooked up with a ¼ H.P. condensing unit, which

reduces the temperature of the refrigerant, causing it to flow freely. There is provided, in addition, a vacuum pump for evacuating cylinders before charging. Since the system is sealed, refrigerant flow through the system is completely moisture-proof.

On the fourth floor are two supply cylinders for each refrigerant: Freon-12, SO₂, methyl chloride and methyl chloride with tracer added. Duplicate shut-off valves are used throughout the system, enabling the operator to maintain safe control.

Special automatic scales used on the second floor are tested and inspected regularly by the City of Chicago. A perpetual inventory record is maintained to indicate the amount of refrigerant remaining in each cylinder.

Fred Fenner connects up a full cylinder in the supply room on the fourth floor.

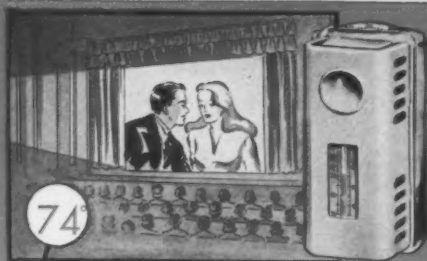
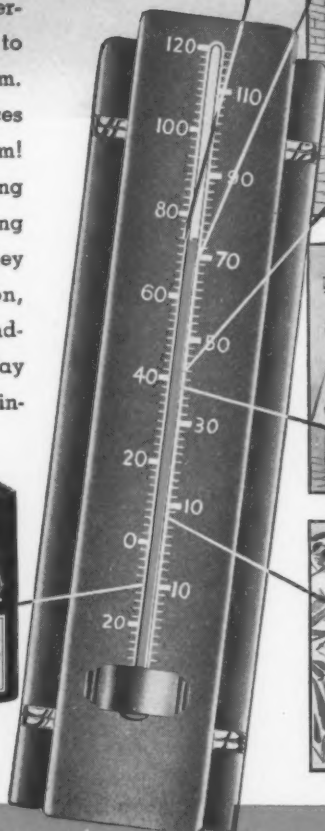
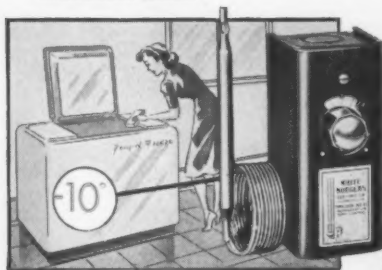


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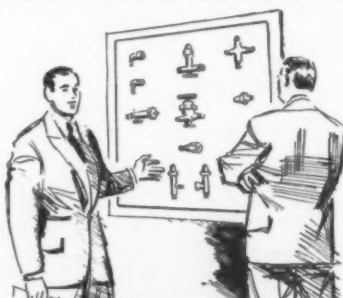
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REFRIGERATION SYSTEMS

Service complaints

PART 9

By J. G. Praetz

General Service Manager
Liquid Carbonic Corp.

SOME of the common complaints on soda fountains equipped with low side floats and holdover tank type ice cream sections are: (1) soft ice cream, (2) hard ice cream, (3) top ice cream soft, bottom hard, (4) frosting back, (5) condensing unit runs too much, (6) short cycling, (7) syrup rail frozen solid, (8) soda and plain water too warm.

Soft Ice Cream:

Some causes of soft ice cream may be improperly adjusted temperature control (set too warm), control stuck in the open position, or control operating erratically. Check control and settings. Adjust or replace if necessary.

Fuse or motor protector blown or unit cut out on overload (manual reset type). Always use fusetrons to protect refrigeration motors and be sure that proper sizes are used for the particular motor. Regular fuses, in order to carry the heavy starting current, have to be oversize and even then afford little or no protection for the motor. If the overload has cut out, reset if manual type and check head pressures, room temperature, possible motor trouble and, if necessary, line voltage to determine the cause of the overload.

Check the main switch and power supply if the machine is stopped and won't run. Check for frozen brine or slushing with a flashlight and stick through the brine tank filling hole. NEVER use matches when checking brine. Highly inflammable alcohol (Solox) is very often used in making up the holdover solution used in brine tanks. If the brine has slushed or is partially frozen, retarding cir-

culatation, shut off the condensing unit, thus allowing the brine to warm up and melt, and then pump out and replace with proper density solution. To accelerate the melting, place heating lamps in the sleeves on both sides of the boiler or partially pump out the brine and add warm water to the tank.

Check for broken or slipping belts resulting in under capacity. Adjust belts for proper tension and check pulley alignment.

A stuck open float would result in insufficient expansion (pressure drop) and too high a suction pressure for proper refrigeration. First, try "flushing" the float and light tapping on the header to correct. Replace if necessary.

A stuck shut float prevents refrigerant from entering the evaporator. Try jarring the float to free it or tap

it lightly. Replace if necessary.

A leaking flapper valve may result in under capacity of the condensing unit and long running time.

Extreme shortage of refrigerant would result in starved evaporator conditions and the "boiler" will generally become oil logged if permitted to operate very long on a refrigerant shortage.

Hard Ice Cream:

Hard ice cream is generally caused by a control set too cold or sticking closed due to burned or badly pitted contacts. If an "open" type control having accessible contacts, clean the contacts or if necessary replace the control and properly adjust.

Soft Top Ice Cream:

Regularly soft ice cream at the top of the can is generally due to insufficient brine. Check the brine level (Fig. 25) and add as required to fill to just below the bottom of the filling hole on the tank. Also check that the top brine isn't frozen or slushy. If the ice cream section is located directly under a ceiling fan, the air current induced by the fan may cause soft top ice cream when the covers are open.

Frosting Back:

Frosting back may be due to a leaking float or stuck open valve. Try flushing the valve. Also check to be sure that a standard orifice float is be-

Fig. 25—Diagram showing proper level of brine (refrigerating solution) and relative level of ice cream in a typical soda fountain cabinet.



ing used, for if XA type it will not shut off against full condensing unit head pressure.

Long Running Time:

If the condensing unit runs too much, check for sufficient refrigerant charge. A shortage will result in failure to close off the float valves and high suction pressure. A stuck open float valve will have the same effect. An inefficient compressor with leaking or bad cylinder valves will operate on long "on" cycles. High head pressure due to dirty or clogged condenser will substantially reduce capacity and cause long running time.

Short Cycling:

Short cycling on pressure controlled units may be due to leaking flapper valves permitting the suction pressure to build up rapidly when the unit stops and cutting the machine back in, or a restriction on the low side, such as plugged screens, stuck shut floats, plugged dryer or filter, partially closed suction line valves.

Too close a differential on the temperature or pressure control may also cause short cycling, as will a pressure control set low on cut-in on a fountain. On dual soda fountain control hook-ups, don't set the pressure control to cut in lower than about 33 to 35 lbs. on F-12.

High Head Pressure:

High head pressure may be caused by anyone or several of the following:

(1) Air in the system. Air is non-condensable and in occupying space in the high side of the system in many cases reduces the effective condenser area, thereby increasing the head pressure. Air being lighter than F-12 or SO₂ will collect at the high point on the high side, usually at the top of the receiver. Purge valves or purging fittings are generally located at this point to permit venting off the air.

Always stop the machine and allow it to remain idle for at least 5 minutes before purging. Open the purge valve slightly or loosen the purge plug so that the air which will separate to the top of the refrigerant vapor will be forced out without disturbing the vapor or liquid. It is advisable to place a cloth over the purge

to prevent any damage from oil or liquid that may spray out.

(2) Too much refrigerant in the system may likewise reduce the effective condenser area, resulting in high head pressure. Purge off at the top of the receiver until head pressure is normal.

(3) Blocked air circulation or a dirty condenser may restrict the flow of cooling air to cause higher than normal head pressures. Always keep the condenser fins free from lint and dirt. Be sure the fan and motor are rotating in the proper direction. Most air cooled condenser fans pull the air through the condenser, and the service engineer should check the fan blades as well as the direction of flow to insure maximum air circulation. Condensers are now generally shrouded to improve efficiency.

(4) Condenser water turned off or

rise is gradual and overload protectors on the motor will provide satisfactory high pressure cut-out protection.

(5) High condensing medium or ambient temperature such as may occur in confined spaces, hot rooms, or extremely hot summer operation.

(6) High head pressure may be caused by an expansion valve open too wide so that the evaporator floods excessively, with resultant frosting back, and too much evaporation occurring in the suction line to the condensing unit, increasing the work of heat removal.

Some of the results of high head pressure are: high operating electrical power cost due to lowered efficiency and longer operating time; repeated motor trouble due to the heavier and possible overloaded conditions; belt failure due to the heavier



restricted. If the strainer in the supply line to the water control valve or in the inlet of the valve becomes plugged, water flow may be sufficiently restricted to produce high head pressure. Loss of cooling water and reduced flow will likewise cause high head pressure.

The rise in head pressure on loss of cooling water is extremely rapid and for this reason *all* water cooled condensing units *must* be equipped with high pressure cut-out electrical controls to stop the machine in case of failure of the cooling water supply.

On air cooled units head pressure

load and long ration; improper defrosting of direct expansion coils on back bar bases and similar fixtures due to shorter "off" cycle (idle time); the fixture may be too cold due to lower average temperature resulting from the longer operating cycle; capacity of machine may be reduced to the point of insufficiency for the fixture load; water consumption on water cooled machines will be tremendously increased due to the water valve remaining open longer and wider.

The higher wattage drawn due to

Continued on page 60



About People

J. W. Rubenson has been appointed manager of the refrigeration division of Day & Night Mfg. Co. Prior to his connection, Mr. Rubenson served as field engineer for Chrysler Airtemp. Previously, he spent 15 years as a leading distributor of re-



frigeration and air conditioning in the Hawaiian Islands. During the war he handled many important installations in that area and conducted a special school for the training of military personnel in emergency repair and maintenance of this type of equipment.

H. A. Malcom, general sales manager of Airtemp Division, Chrysler Corp., has been appointed a vice president of that organization and will have the joint title of vice president and general sales manager. Mr. Malcom joined Airtemp in 1941 and has



served in a variety of executive sales capacities.

Edward A. Flesh has been appointed field engineer in the eastern territory for Henry Valve Co. With headquarters in Philadelphia, he will cover eastern Pennsylvania, New Jersey, Delaware, Maryland, and Virginia. Mr. Flesh previously has been associated with Merchant & Evans Co. and Mueller Brass Co.

In a list of new appointments announced by General Electric Co.'s product service division, **J. A. Morris** and **G. M. Bennett** have been

named district appliance service supervisors in Kansas City and Chicago, respectively, and **D. J. Bevan** has been named superintendent of the company's refrigerator machine factory in Long Island City, N. Y. Mr. Bevan joined the company in 1934 as a mechanic in the Long Island plant. Mr. Morris joined G-E in 1944, and Mr. Bennett came with the company the following year.

Austin L. Brown has been named sales representative in the southeast-



ern states for Temprite Products Corp. and Peerless of America, Inc. He will make his headquarters at Marietta, Ga., a suburb of Atlanta. Mr. Brown has been connected with the refrigeration industry for 10 years, first as a district manager for Fedders Mfg. Co., later as an estimating engineer for York Corp., and then as a manufacturer's representative.

E. W. Gaughan has been named assistant general appliance manager of Westinghouse Electric Supply Co. He formerly was appliance manager

in the company's west central district.

George T. Jahnke has been appointed director of advertising of The Liquid Carbonic Corp. Mr. Jahnke was in charge of Liquid's advertising from 1919 until shortly after the outbreak of World War II, at which time he organized a division to expedite materials and parts for war contracts.

D. K. McIlvaine has been elected vice president of Henry Valve Co., and will have charge of engineering and manufacturing. He has been associated with the organization since September, 1945. During the war he was connected with the Bell Telephone Laboratories and Western Electric Co., specializing in the manufacture of radar components.



H. B. Weeks has been appointed New England sales representative for Temprite Products Corp., with headquarters in Boston. Mr. Weeks' experience in the refrigeration industry extends over a period of 15 years, during which time he has



served as appliance sales promotion man, wholesaler's representative, and manufacturers' agent.

William G. Conley, Jr. has been appointed manager of the kitchen sales division, Edison General Electric (Hotpoint) Co. He was formerly sales manager, counter equipment group, electric commercial cooking equipment division of the company.

Four new appointments have been announced by The Mathieson Alkali Works. **Harold R. Dinges** has been named sales manager of one of the company's rearranged southern districts, with headquarters at Charlotte,

Continued on page 69

*Refrigeration
and
Air Conditioning*
EXPOSITION
CLEVELAND
PUBLIC AUDITORIUM
OCT. 29 TO NOV. 1
SEE YOU IN CLEVELAND!



The 1 1/2-hp air cooled condensing unit handling this floral display case is cleverly concealed from view behind a mirrored offset just over the stair well. Arrow indicates grilled access door.



Many applications of cooling equipment can be seen in this store. Arrow at top left points to the air diffuser.

By James R. McCallum Jr.

HOW much refrigeration equipment goes into a really "super" super market, a completely modern retail food merchandising establishment such as the newest store of Penn Fruit Co. in Philadelphia?

The answer to that question is an emphatic "Plenty!" And it ranges in type from self-contained display cases to heavy-duty air conditioning equipment, and from low temperature walk-in coolers for frozen food storage to conventional florist display cases.

This type of up-to-the-minute food store, which will be steadily increasing in number as the larger chains and independents launch war-delayed expansion and modernization programs, presents an extremely attractive prospect to the commercial refrigeration and air conditioning dealer equipped to handle the job.

Let's use the new Penn Fruit store as a specific example.

Three local Philadelphia firms co-

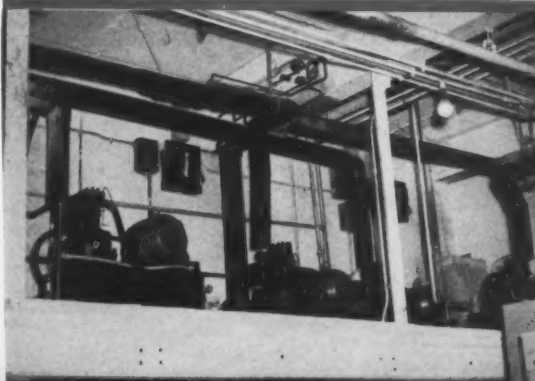
operated in equipping this streamlined new store. Mack Machine Co. of Pennsylvania, Inc., Frick distributor, installed the bulk of the commercial refrigeration equipment. The soda fountain department was installed by the Supplee-Wills-Jones dairy company. Air conditioning of the establishment was handled by the George C. Lewis Co., G-E distributor.

Display cases and self-contained unitary equipment were purchased on a direct-sale basis from C. V. Hill &

"Super" For a SUPER

The installation in Philadelphia food store points the way of opportunity for the refrigeration and air conditioning contractor in the varied applications

To conserve space in the store's storage area, four condensing units were located on this steel and wood platform suspended from the stockroom ceiling.



A unique checking service is provided by the store's cashier standing next to the refrigerated cabinet which



In this view of the market's streamlined interior, for the main floor air conditioning system.



Another clever camouflage job is indicated by the black arrow. A 2-hp air cooled condensing unit is located within the grilled display stand at each end of this four-case refrigerated island.

Cooling ER MARKET

Philadelphia's most complete
to new and wider fields
commercial refrigeration
factor capable of handling
of equipment required

Co., Inc. and Weber Showcase & Fixture Co., Inc.

Advertised as "America's most complete food store," this newest link in the 11-store Penn Fruit chain is located at 19th and Market Streets in the heart of the city's business and shopping district, and boasts some 46,700 sq. ft. of floor space. It was built to replace a previous store on this same location which was destroyed by fire late in 1943. Architects for the new building were Thal-

heimer & Weitz of Philadelphia.

Containing 10 complete food departments, the market is divided into three sections: (1) the street floor, which is devoted to sales of meat, dairy products, delicatessen items, frozen foods, and similar merchandise; (2) the basement, in which is located the dry grocery department and 9,000 sq. ft. of space devoted to produce storage and preparation, bulk cooling equipment, etc.; and (3) the balcony, which is used for offices, rest rooms, and supplementary storage.

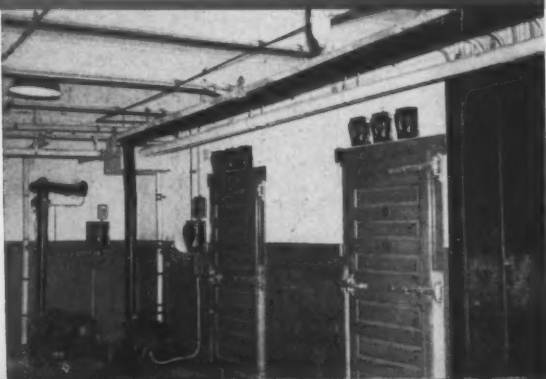
During the store's first full week of operation more than 60,000 actual customers passed through the doors. And that's not counting the additional thousands who just dropped in to look around.

To give some idea of the quantity of refrigeration equipment which went into the new Penn Fruit store, here is an itemization of the remotely installed Frick condensing units which are located in the basement in the rear section of the store building. Listed by number of units of each

Here is one end of the row of walk-in coolers which the market uses for storage of meat, fresh produce, dairy products, and frozen foods in bulk quantities.



for perishable produce customers is provided by this is held at about 40 F.





size, there are: two 5-hp, six 3-hp, one 1½-hp, one ¾-hp, and one ½-hp, all of which are water-cooled.

In addition, there are two 2-hp air-cooled and one 1½-hp water-cooled remote Frick condensing units located on the main selling floor in concealed locations.

In describing the market's refrigeration equipment in more detail, let's start off with a customer's-eye view of the sales and display units located on the store's selling floors.

On the left of the market's main entrance is the principal frosted foods department consisting of six Weber "Roll-A-Door" cases placed back-to-back to form an island unit for self-service operation. These six cases, as well as three more units of the same type which form the basement frozen foods department, are self-contained and are fitted with transparent siding lids.

On the right, just past the stair well leading down to the basement store, is located a 3 x 14 x 6-ft. florist case with the usual glass front providing maximum display. This case is refrigerated by a 1½-hp water-cooled Frick condensing unit.

This unit presented one of the many problems faced by John W. Hart, installation and service manager of Mack Machine Co., and Frank Haldeman and Gilbert Keller, Mack installation mechanics, in connection with the installation.

To place this condensing unit in the basement with the other equipment would have necessitated refrigerant lines for more than 150 feet. To avoid this, Mr. Hart provided for installation of the unit behind a mirror-paneled projection just over the stair well, where it is completely concealed from public view. This location has proven very satisfactory to all concerned.

This flower sales department was added primarily for the convenience of those shoppers who might desire cut flowers or floral centerpieces for their table, and has proven extremely popular ever since the store's opening day.

On the right-hand side of the mar-

Some of the other types of refrigeration equipment installed in this ultra-modern super market include, top to bottom: meat cases, wall dairy cases, self service frozen food cabinets, delicatessen cases, and soda fountain units.

ket in the rear, past the fresh produce section, are two large upright wall-type self-service dairy cases, with big double doors. These units are Hill equipment, as are all the refrigerated sales and display cases in the store with the exception of the frozen food cases. They are connected to a 1½-hp compressor located in the basement.

Strung along the far left wall of the main floor is the meat department, with nearly 60 feet of display cases lined end-to-end. Another 3-hp condensing unit cools these cases. In line with these cases is a 12-ft. fish case powered by a ½-hp compressor.

The island facing the meat department features delicatessen foods, including cold meats, sliced cheeses, etc. The front case of this island is refrigerated and contains white enameled trays and platters holding 15 different varieties of prepared food including salads, stews, puddings, and similar items.

This unit, together with other delicatessen cases totaling approximately 48 feet in length, is powered by another 3-hp condensing unit.

In the rear center area of the store is another island made up of two self-service dairy cases and three cases in which cut-up poultry, pickled herring, smoked fish, and similar delicacies are displayed. Refrigeration for this island is provided by a 3-hp condensing unit.

In the left front area of the main floor is still another island composed of four cases placed back-to-back and providing a total of 48 linear feet for a self-service display of pre-packaged cheese and eggs.

Refrigeration for these cases is supplied by two 2-hp air-cooled condensing units cleverly concealed behind the enclosed bases of display stands placed at each end of the island. Bases of these stands are grilled, of course, to provide the necessary air circulation.

Stretching across nearly the full width of the store at the extreme rear of the main floor selling area is the soda fountain and luncheonette unit with stools for 40 customers. The four refrigerated units in the fountain and the two in the back bar are cooled by two ½-hp and two ¾-hp Brunner compressors, also located in the basement.

Lines connecting these condensing
Continued on page 48

REFRIGERATION INDUSTRY

News

WHITING CORP. HITS HOME FREEZER FIELD WITH TWO MODELS

Formation of a new Refrigeration Division to manufacture and market home freezers and other refrigeration products has been announced by the



Mr. Roberts

Whiting Corp., Harvey, Ill., manufacturer of electric cranes, hoists, evaporators, filters, and foundry equipment.

The refrigeration division is under the direction of Howard R. Roberts, Whiting vice president. Mr. Roberts, who has had long experience in the development and marketing of home freezing units, spent several years as general sales manager of the Deep-freeze Division, Motor Products Corp.

Two new home freezer models, with capacities of 4½ and 11 cu. ft., are the first Whiting refrigeration products to be announced. (See "New Products" section of this issue for more detailed specifications.)

K. C. REFRIGERATION ENGINEER DIES

G. Eugene Tribble, 43, refrigeration engineer and a charter member of the American Society of Refrigeration Engineers, died at Kansas City, Mo. in St. Luke's hospital July 24 after a two weeks' illness.

ENTIRE INDUSTRY FOCUSES ATTENTION ON CLEVELAND SHOW; 167 EXHIBITORS SIGN

With the addition of 14 new names, the total number of exhibitors signed for display space at the fourth annual All-Industry Refrigeration and Air Conditioning Exposition has risen to 167.

Final plans for the show, which will be held in the Cleveland Public Auditorium Oct. 29 to Nov. 1, are rapidly shaping up, as are the plans of the various organizations which will participate.

The 14 latest companies and organizations to sign for booth space are:

Monsanto Chemical Co.; National Association of Re-

frigeration Contractors; National Frozen Food Locker Association; Frozen Food Locker Manufacturers and Suppliers Association; H. A. Phillips & Co.

Refrigeration Equipment Wholesalers Association; Refrigeration Service Engineers Society; Frozen Food Packaging Division, Whitney Brothers, Inc.; American Society of Refrigerating Engineers; The Yoder Co.

For all these men, the exposition will be the first opportunity they have had since 1941 to view a "full dress parade" of the industry's products as they include improvements, new designs and new applications of both refrigeration and air conditioning during the war years.



Owens-Corning Fiberglas Corp.; Sterling Refrigeration Co.; Brown Electric Co.; Ice Air Conditioning Co., Inc.

More than 20,000 business men who are closely associated with the refrigeration, air conditioning, and frozen food equipment

TEST STANDARDS SET FOR HOME FREEZERS

Standards of test procedure for home and farm freezers have been adopted by the Farm and Home Freezers Manufacturers Association and have been published for distribution.

This action was one of the chief results of the association's summer meeting, at which four new members were added to the group. These new members are: Norge Division, Borg-Warner Corp., Detroit; Fraser & Johnston Co., San Francisco; Kelvinator Division, Nash-Kelvinator Corp., Detroit; Kel-Kold Co., Inc., Johnstown, N. Y.

A committee also was formed to study the subject of publicity and public relations. This committee consists of: E. N. Guild, Norge; I. A. Ponon, Refrigeration Corp. of America; H. L. Schaefer, Schaefer, Inc.

Next meeting of the association probably will be held in Chicago sometime in November.

COOLING THE ATOMIC BOMB



Delicate parts of the "underwater" atom bomb exploded in Bikini lagoon were protected by the same 12 Chrysler Airtemp packaged air conditioners which guarded the earlier bomb dropped on the target fleet at Bikini. Constant temperature control was vital in the laboratories to insure both the success of the tests and the safety of the technicians. In the picture above, Roy M. Coyle (left) and Richard Fennel are shown installing one of the units.

100TH FIRM JOINS REMA

Membership in the Refrigeration Equipment Manufacturers Association has passed the 100 mark, directors of the organization learned at their annual midsummer meeting Aug. 15 in Marinette, Wis., where they were the guests of F. J. Hood, vice president of Ansul Chemical Co. and last year's Rema president.

The 100th company, voted into the membership at the meeting, is Drayer-Hanson, Inc., Los Angeles, manufacturer of heat transfer equipment. During the last three years, Rema has more than doubled in size, and now is the largest association of manufacturers in the mechanical refrigeration and air conditioning industry.

In a statement to directors, Rema president H. F. Spoehrer credited the growth of the association to its various overall and product section activities and to its cooperation with other associations in the industry. He cited the Rema public relations program, efforts in working with the OPA "which have brought about the decontrolling of our industry," cooperation with the National Bureau of Standards in building commercial standards for the industry's products, and the forthcoming All-Industry Refrigeration and Air Conditioning Exposition in Cleveland this fall as "clear-cut indications of the steady and very thorough growth of Rema."

YORK GETS O.K. ON NEW PLANTS

Authorization for a building program costing more than \$1 million has been granted York Corp. by the Civilian Production Administration.

The company plans to build two new plants and four building extensions which will add 113,000 sq. ft. or about 10% to its manufacturing space at York, Pa. Some internal plant changes also are planned.

York also plans to spend about \$3 million on production tools and to completely reorganize its plant into 12 production areas, according to S. E. Lauer, president.

JUNE SHIPMENTS 210,000 UNITS

Shipments of domestic mechanical refrigerators during June rose 7% during June to total 210,000 units, but were still 32% off the prewar monthly average of 309,000 units, Civilian Production Administration reports. During the first half of 1946 shipments totaled approximately 843,000.

Shortages of tin mill black plate, motors, magnet wire, steel and electric steel lamination continue to hamper production, CPA said.

G-E SMALL MOTOR OUTPUT AT PEAK

General Electric Co. is currently producing more than 100,000 small motors weekly, far exceeding its prewar peak of 80,000, the company reports. Copper is being diverted from cables and other heavy items to use in motor making. Once the copper situation eases, the company expects to reach a weekly production level of 125,000 units.

CROSELEY NET SALES NEAR \$5 MILLION

Net sales of Crosley Corp. for the first quarter of 1946, as reported to stockholders of the corporation, were \$4,932,680.

Net loss from operations was reported as \$223,896, after provision for anticipated refund of the prior year's excess profits taxes amounting to \$491,000.

HOUSEHOLD MFGS. LIMITED TO 30-DAY INVENTORY BY CPA

To assure a steady and rapid flow of new production of certain scarce household appliances (including mechanical refrigerators) to the housewife, the Civilian Production Administration has placed inventory limitation on manufacturers of a number of finished products in this classification.

At the same time, inventory controls on manufacturers' stocks of 27 materials and components were tightened.

Priorities Regulation 32, the inventory control regulation, now contains an added list of manufactured products. Manufacturers' inventories of these products must now be limited to either 30 days' production or a practicable minimum working inventory, whichever is less.

CARRIER SHIPMENTS AT RECORD HIGH

June was a record peacetime month for Carrier Corp., shipments during the month reaching 5,894 units valued at approximately \$1,880,000.

BUYS NEW BUILDING

Hoffman Supply Co., Springfield, Mo., refrigeration supplies wholesaler, has purchased a new brick building 560 N. Jefferson which will be the firm's new home. Harry G. Hoffman owns the company.

KELVINATOR EASTERN SALES MGR. DIES

Steele R. Sellers, eastern sales manager, Kelvinator Division of Nash-Kelvinator Corp., died suddenly of a heart attack Aug. 3 at his home in Birmingham, Mich. Mr. Sellers was associated with the Western Pennsylvania Power Co. and with Western Electric before joining Nash-Kelvinator. Prior to World War II he was sales manager of Kelvinator electric ranges, and during the war was appointed assistant to the vice-president for war production.

1946 TRADE-IN MANUAL PUBLISHED

Announcement that the new and up-to-date 1946 edition of the Standard Refrigerator Trade-In Manual & Dealer Guide is now ready for distribution has been made by Maurice Mann, publisher.

More than 20 household refrigerator manufacturers cooperated in supplying new photographs, specifications, and other data to complete the current edition. This material has been integrated with other household refrigerator data and supplements the existing information on more than 1000 key refrigerator models marketed during the past 18 years. Over 2500 trade-in values are listed as a guide for dealer transactions.

WEST COAST WHOLESALE MEET



West coast wholesalers attending the summer meeting of Region 10 of the National Refrigeration Wholesalers Association pose with some of the officials of the national organization. Standing, left to right, are: G. C. Armour, Al Reinach, H. A. Halls, Merle Stutzman, Bob Hinshaw, Gerald S. Robinson, A. W. Sheldon, H. L. Whatcott, Hal Clay, Wyatt Brown, G. Van Ginkel, Jack Tupper, Ted Chamberlin. Seated, in the same order, are: Jack Skotland, Harold Stern, B. E. Watters, Lem V. Branson, Ted Glou, H. S. McCloud, Art Tudury, C. E. Baker.

COAST PRODUCERS OF REFRIGERATION FORM NEW GROUP

To identify themselves as an industry and to handle labor relations and the joint negotiation of labor agreements, a group of refrigeration manufacturers in the Los Angeles area has organized the Refrigeration Manufacturers Association of Southern California.

The association has been formed and incorporated as a non-profit trade association and will probably expand to cover the usual operations of a trade association, according to Laurence K. Brink, executive secretary. Present offices of the organization are at 1151 S. Broadway, Los Angeles, where the offices of the Refrigeration Contractors Association of Southern California also are located.

Of the 16 firms listed as charter members of the group, all but one (Modern Refrigeration Works, Glendale) are in Los Angeles.

Charter members and their representatives are:

Artic-Temp Mfg. Co. (E. Allen and S. M. Colin); Baker Ice Machine Co., Inc. (C. Hollingworth and H. T. Cory); Carl Craft Co. (Carl Conkle and Ray Myre); Coldew Corp. (B. Bakke); Drayer & Hanson (M. J. Burke); Elster's (Sam Elster and Maurice Landman); Gay Engineering Co. (R. N. Gay and Fred Wells); Modern Refrigeration Works (A. Peterson).

Refrigeration Mfg., Inc. (Robert Noll and Lee Prather); Refrigeration Engineering, Inc. (H. Jarvis and J. L. Calvert); Super-Cold Corp. (B. Glazer and C. T. Byrd); Vering Mfg. Co. (L. Vering); Vico Refrigeration & Mfg. Co. (C. A. Walther and K. M. Johnson); Ward Refrigerator Co. (Harry Ward and P. R. Asmussen); Weber Showcase & Fixture Co. (Clyde Meyers and Fred Weber); York Corp. (R. Lauer and T. Tathauer).

N. CAROLINA COMML. DEALERS ORGANIZE

A. J. Edmundson, sales manager of First Colony Distributors, Inc., Raleigh, was elected president of the Commercial Refrigeration Association, at a dinner meeting held at the Carolina Hotel in Raleigh, N. C. Among those attending the meeting were manufacturers, representatives, distributors, and dealers from all principal cities in eastern North Carolina.

Other officers of the association who were elected at the meeting were: W. H. Jones, Refrigeration Sales & Service, Raleigh, vice-president; J. O. Bullock, C. H. Stephenson Music Co., Raleigh, secretary-treasurer.

The Board of Directors, appointed by the new president to act as zone managers, are:—E. C. Smith, Smith Refrigeration Sales Co., Fayetteville; L. A. Croom, Croom's Refrigeration Service, Robersonville; L. M. Danciliff, C. V. Hill Co., Raleigh; G. R. Scott, Scott Refrigeration Service, New Bern; R. A. Scofield, S. C. Conrad, Distributor, Greensboro.

The new association will be affiliated with the National Commercial Refrigerator Manufacturers Association.

NEW OPA RULES ON PRE-TICKETED ITEMS

Retailers and wholesalers of so-called "big ticket" items, including refrigerators and other major appliances, are forbidden by a new OPA regulation to change, remove, or in any other way disturb the price ticket applied by the manufacturer.

The regulation further stipulates that any retailers or wholesalers who may have removed or changed such ticket between July 1 and July 25, when OPA controls were not in force, must not sell any of these items until they have replaced these tags or have received new and correct price tags from their supplier.

JOINS BRIDGMAN CO.

R. E. Kenney, formerly with Kelvinator, has joined the Clark Bridgman Co., representative for Bush Mfg. Co. in the Chicago area, to cover Wisconsin, Minnesota, North and South Dakota, Nebraska and Iowa. He will have headquarters in Minneapolis.

NEW BUILDING FOR SERVICING FIRM

Campbell's Refrigeration Co., San Luis Obispo, Calif., has received CPA approval for construction of a new refrigeration service building, to cost \$3,600, at 532 Higuera Ave.

COMPACT COMPRESSOR



A new hermetic compressor no larger than a quart milk bottle and weighing approximately one-third as much as existing conventional models has been announced by Jack & Heintz Precision Industries, Inc., Cleveland. Experimental installations in household refrigerators have been made and life tests are now being run. Development is nearing completion on units of 1/8 to 1/6 hp for application to the household refrigerator field, and other models are under way for a variety of commercial applications. Miss Mary Dublin, Cleveland's Sesqui-centennial Queen, holds one of the new compressors to show its comparative size and its light weight.

COMMITTEE AIMS AT STANDARDIZATION OF TRADE SYMBOLS

To provide terms, symbols, and definitions relating to principles, processes, and equipment in design, manufacture, use and maintenance in the refrigeration industry is the function of the new American Standards Association Nomenclature Committee B53, sponsored by the American Society of Refrigerating Engineers.

Although it is realized that there may be more than one proper way of expressing many of the commonly used terms, it is felt that it would be desirable for the refrigeration and air conditioning industry to agree on the preferred nomenclature.

Chairman of the new committee is Sterling F. Smith, general sales manager of Baker Ice Machine Co. M. M. Lawler of Worthington Pump & Machinery Co. is vice chairman.

Work of the committee is divided into four sub-

jects, each to be studied by a separate sub-committee. Subjects and chairmen of these sub-committees are:

(1) Definitions — R. J. Thompson, sales engineer, Kinetic Chemicals Co.; (2) Abbreviations — Clifford Strook, editor, Heating and Ventilating; (3) Letter symbols, Prof. Carl F. Kayan, assistant professor of mechanical engineering, Columbia University; (4) Graphical symbols—E. R. Wolfert, manager of refrigeration engineering, Westinghouse Electric Corp.

BROOKLYN JOBBER INCORPORATES FIRM

The Capson Co., Brooklyn, N. Y., wholesaler of refrigeration and air conditioning parts and supplies, has been incorporated under the name of The Capson Co., Inc. Officers of the corporation are: Charles A. Posé, president-treasurer; Raymond J. Posé, vice president; Albert C. Posé, secretary.

SEEK BETTER BREAK FOR LOCKER PLANTS

Asserting that food processing and preservation are being "hindered and discouraged" by the discrimination of many district offices of Civilian Production Administration against construction applications for locker plants, two associations—National Frozen Food Locker Association and Frozen Food Locker Manufacturers and Suppliers Association—are asking CPA to reclassify locker plants as processing plants under the Veterans Housing Program building order.

In its present classification, a locker plant is considered in the same category with offices, banks and stores.

In a brief filed with CPA chief John D. Small, R. R. Farquhar, executive director of the manufacturers and suppliers group, said that his organization believes that "a majority of the locker plant applica-

tions can be approved without harm to the veterans' housing program."

NEW COOLER FIRM FORMED IN UTICA

Magic-Temp Cooler Co. has been organized in Utica, N. Y. to manufacture home and farm freezers, self-service frozen food cases, dry beverage units, and steel shelving. Sol Slive and Harry Gould head the new firm. The Magic-Temp line is being fabricated at the Hameline Sheet Metal Works in Whitesboro, N. Y.

NEW WHOLESALE OPENS IN DULUTH

Refrigeration Wholesalers, Inc., has been opened at 7-9 N. 20th St., Duluth, Minn., as a wholesaler of refrigeration supplies. C. A. McCafferty and Frank Pond, who operate Refrigeration & Industrial Supply Co., Inc., Minneapolis, head the new organization.

WESTINGHOUSE PASSES PRE-STRIKE VOLUME

Refrigeration production at the Westinghouse Appliance Division, Mansfield, Ohio, has surpassed pre-strike levels and is expected to continue to increase as more steel and component parts become available.

Now in production is the B-7, a 7 cu. ft. home refrigerator, which is being sent to Westinghouse distributors on a quota basis. The new OPA ceiling price for this model is \$187.95. Present plans call for production of a 9 cu. ft. model for which OPA has not yet set a ceiling price.

YORK PRODUCTION HITS NEW HIGH

Production and employment at York Corp. are at the highest peak in the company's history, including the war period. It is stated in the firm's nine-month report to stockholders.

A large part of this production, it is explained, is going into work in process, resulting in products and systems in various stages of completion, a large portion lacking only a few short items before shipment.

In anticipation of more stable conditions in the near future, and with a heavy backlog of unfilled orders, the company has increased the number of its production employees by 31% over a year ago, it is reported.

Net profit after provision for taxes for the nine months ended June 30, the report shows, totaled \$791,062, against \$833,193 for the comparable period of 1945. Orders booked for the nine months aggregated \$28,559,122, compared with \$22,620,873 for the same period of the previous year, while completed sales added up to \$15,976,014 against \$24,098,366.

COOLING FINANCED BY \$130,000 REA LOAN

The Rural Electrification Administration has announced approval of loans totalling \$130,000 to five cooperative groups in five states. The funds will be used to finance refrigeration plant facilities, farmstead wiring and plumbing.

EXPORT FIELD SHOWS SIGNS OF PROMISE

South Africa is not only booming but is keenly interested in American products, particularly air conditioning units and equipment, according to J. Luck of Export Distributors Co., New York City.

Substantiating this interest, Mr. Luck reported that the chairman of Ernest Zehmuller, Esq., one of the company's large South African accounts, was planning a trip to the U.S. for the express purpose of arranging for distribution of air conditioning equipment through the firm's offices in Cape Town, Johannesburg, Lourenco Marques, Port Elizabeth, and Durban.

* * *

Orders already placed for Philco refrigerators and radios by Central Radio Mfg. Works, Shanghai, China, indicate that this firm may well become one of the largest of Philco's 140 export distributors, according to Dempster McIntosh, president of Philco International Corp.

"Despite the ravages of an eight-year war," Mr. McIntosh explained, "Chinese purchasing power remains substantial and the market for American appliances is rapidly expanding. With the spread of electrification in China, the prospects for radios, refrigerators, and eventually freezers, air conditioning units, and television sets looks most promising."

KRAMER EXPANDS TEST LAB FACILITIES

The experimental laboratory facilities of the Kramer Trenton Co., Trenton, N. J. have recently been enlarged in order to permit more intensive research in the low temperature field.

Among other pieces of new equipment recently installed is a large, low temperature walk-in refrigerator capable of maintaining temperatures below -40 F over a wide range of humidities subject to close control.

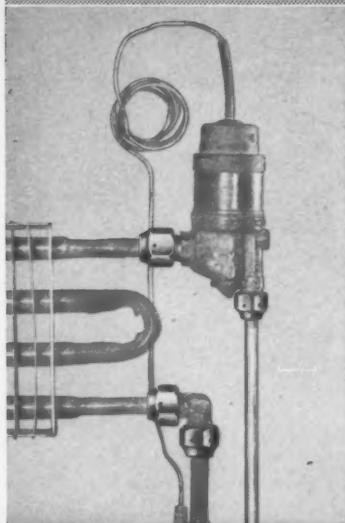
This box permits the testing of large capacity units under the most severe conditions. It is equipped with modern instruments for indicating and recording temperatures, humidities, refrigerant flow and current consumption.

SERVICE SEMINAR



J. A. Fox, General Electric product specialist on refrigerators, explains some features of one of the new models to W. W. Waler, F. E. Isbel, and R. Vigus, distributor service managers from Salt Lake City, Boise, Idaho, and Butte, Mont., respectively, at a meeting held by G-E's product service division at San Francisco. This meeting was one of a series of four designed to serve as refresher courses on older equipment as well as informative sessions on the new models. Total attendance at these schools topped 200, with every G-E major appliance distributor being represented. Other locations were Atlanta, Bridgeport, and Kansas City.

★ STA-TITE THE REFRIGERATION FLARE NUT which cannot Creep or Work loose



Moisture will work its way along the threads, to fill the space between the fitting and the inside of the flare nut. Confined in this space, the water, in its attempt to freeze during the operating cycle, develops a tremendous pressure—16,400 p.s.i. at 20° F. Something has to give at such high pressures . . . (1) the nut may stretch, (2) the male fitting may collapse, (3) the copper tube flare may extrude . . . any one of which will allow the flare nut to loosen. You know the rest—moisture in the system and/or loss of refrigerant. A condition which has long baffled the refrigeration industry.

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NO. 134

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Mod.	Lgth.	Dpth.	Hght.	Bins	Cap.
B75	75"	28"	39"	5	*23cs.
B98	98"	28"	39"	6	*33cs.

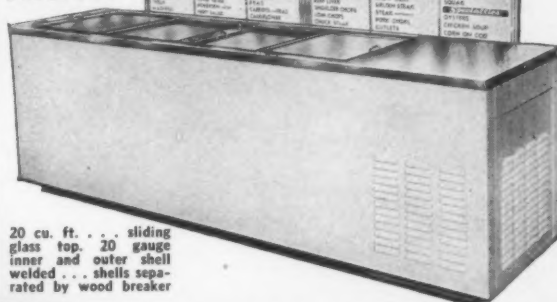
*12 oz. Pepsi-Cola Bottles.

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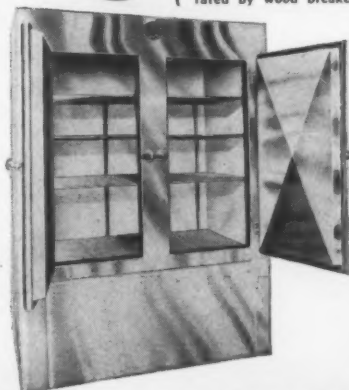
QUALITY FRIGITEMP GLASS TOP FREEZER CABINET

for Frozen Foods . . .



20 cu. ft. . . . sliding glass top. 20 gauge inner and outer shell welded . . . shells separated by wood breaker

frame. 4" insulation sides; 5" bottom. Finished in glossy white lacquer. Top covered with 18-8 stainless steel. Self-contained or remote units.



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. . . Stainless Steel interior, Polished Stainless Steel exterior . . . door corners rounded. Overhead heavy-duty blower coil allows full, clear depth storage space. Adjustable wire shelves.

Model	Cu. Ft.	Width	Depth	Hght.	Doors
SR1-20S.C.	20	50"	25"	68"	2 Blower
SR1-29S.C.	29	52½"	29½"	74"	2 Blower
S.R.C.-42 (Remote)	42	53"	30"	74"	4 Blower
S.R.1-16S.C.	16	45"	22"	67"	2 Cu. Maker
SC.C20	20	50"	25"	68"	2 Cu. Maker

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"SUPER" COOLING . . .

Continued from page 42

units with the fountain itself were run underneath the fountain to a point directly over the compressor location and then were all dropped down through the floor at this point. This method of connecting up the units involved the use of some 400 feet of 1/2-in. and 400 feet of 1/4-in. tubing, but it eliminated the necessity of breaking through the floor in more than one spot.

Joe Fanning and Fred Weber, service men for the Supplee dairy organization, and Bob Eason, Penn Fruit fountain supervisor, handled the installation of this equipment.

Checking for Perishables

One of the more interesting new applications of refrigeration equipment is the 6-ft. horizontal chest type refrigerator cabinet which is used for checking customers' perishable packages.

Located "front and center" on the market's main selling floor, this unit is handy for shoppers who have purchased meats, frozen foods, or any other perishable items from the main floor sales area and then want to shop for dry groceries in the basement. An attendant checks their perishable packages in the refrigerated cabinet, and returns them to the customers as they leave the store.

This cabinet, which is completely self contained, is held at a temperature of about 40 F.

Refrigeration equipment in the market's basement selling area is confined to a secondary frozen food department, located at the foot of the basement stairs and composed of three self-contained Weber cases identical with those on the main floor, and a bank of three self-service Hill dairy cases placed against the back wall and connected to a 3-hp condensing unit.

As pointed out previously, the bulk of the remotely installed condensing unit equipment is located in the processing, storage, and equipment area at the rear of the market's basement floor.

A number of problems were encountered in the installation of this equipment and in connecting the various condensing units to the dis-

play or sales cases which they serve.

For instance, refrigerant and suction lines for this purpose were run between the floor of the main selling area and a false ceiling covering the full expanse of the basement sales area. But inasmuch as the refrigeration equipment was among the last equipment to be installed, this space was already pretty well cluttered up with piping, tubing, and ductwork for the market's other facilities.

So to simplify running of the lines for the refrigeration equipment, many of which had to be carried a considerable distance, Mr. Hart employed a series of four or five 5/8-in. lines instead of the larger lines which he normally would have used. These smaller lines were far easier to handle under these circumstances, he found, as they could be more readily bent around and threaded through the maze of other lines and obstructions encountered.

The tubing was run continuously so that there would be no joints in the area between the floor and the false



*"Now let me ask you something
—when do I get that new re-
frigerator I ordered from you?"*

ceiling, thus minimizing the possibility of hard-to-get-at leaks. These multiple lines were connected into headers at the units.

These lines were wrapped in hair-felt and bound with 4-in. tape, because of the obvious difficulties in using cork insulation in such an application. All other lines were insulated with brine-thickness cork covering. All joints were sealed with either "Sil-Fos" or "Phos-Copper" using oxy-acetylene equipment at high temperatures, as Mr. Hart is firmly convinced that this treatment minimizes the possibility of joint leaks and saves

a lot of trouble in the long run.

All remote systems are equipped with liquid suction hand stop valves. In addition to the normal defrost cycle, time clocks automatically provide shutoff from midnight until 3 a. m. on all units except the frozen food storage box. Solenoids, driers, and sight glasses are installed in liquid lines with a three-valve by-pass so that any one can be serviced without shutting down the system.

To conserve floor space in the rear basement area, which is badly needed by the market for bulk storage of non-perishable items, Mr. Hart mounted four of the condensing units—one 5-hp, two 3-hp and a smaller unit—on a platform suspended from the ceiling.

Bulk Storage Rooms

One entire section of this rear basement area is devoted to a row of walk-in coolers for various purposes.

An 18 x 28 x 10-ft. meat box is held at about 34 to 35 F. by a 5-hp compressor. Fin coils salvaged from the company's old store were used in this box. New coils were used to hold the 13 x 18 x 10-ft. cooler for delicatessen products to about the same temperature. This unit is powered by a 3-hp compressor.

Another 3-hp condensing unit handles one fruit and one vegetable storage box, each of which measures roughly 13 x 16 x 9 ft. and is held at 38 to 41 F. Unit coolers also salvaged from the old store were used in these coolers. A second 5-hp compressor provides the cooling necessary to hold the 10 x 15 x 9-ft. bulk storage box for the frozen foods at —5 to 0 F.

Fins For Plates

At the time this low temperature cooler was built, plate type evaporators were unavailable, so fin coils were used instead. These coils have worked out quite satisfactorily, Mr. Hart reports, but he plans to replace them eventually with the plate units.

All other fixtures came completely equipped with lowsides. The 8 x 10 x 8-ft. walk-in for bulk storage of dairy products is cooled by a ¾-hp air cooled condensing unit.

Each of the walk-in coolers is equipped with remote-bulb type thermometers, so the interior temperatures can be noted at a glance without opening the doors into the coolers.



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Jamison cold storage doors are used throughout.

Located right next to and connected to the main floor sales area is a smaller sales room eventually intended for the sale of frozen pastry and other products from the store's model bakery. But delays in obtaining the necessary equipment have made it impossible to complete the bakery, so at present the store is being used to merchandise the company's line of candies.

None of the display cases in this store area are refrigerated, and it was found that with the beginning of warm weather many of the chocolate coated confections were being discolored by the heat and otherwise losing their eye (and consequently their sales) appeal. To remedy this situation a 3-hp Airtemp store cooler was installed in the rear of the store area and is serving effectively as a stop-gap measure.

When the bakery is finally set in operation, however, this packaged cooling unit will be moved down to the rear basement area to provide more comfortable working conditions in the rooms where fresh fruit and vegetables are cleaned and processed before being placed on display.

Conditioning Is Zoned

Equipment shortages also have delayed the completion of the market's air conditioning system, which was designed by George C. Lewis, head of George C. Lewis Co. and a registered engineer in the state of Pennsylvania, and was installed by his organization. Charles S. Leopold, nationally known consulting engineer of Philadelphia, and president of the American Society of Refrigerating Engineers, served as consultant on the job.

When completed, the air conditioning system alone will embody 130 tons of refrigeration equipment. The system will be zoned into three separate areas, with 90 tons cooling the main floor area, 30 tons conditioning the basement store, and 10 tons serving the balcony offices and the bakery shop. Completion is expected in the early fall.

So far the only part of the air conditioning system actually completed is that for the basement store. The offices on the balcony will be cooled from a central plant office system.

By far the most unique part of the

entire air conditioning job is the patented semi-circular diffuser designed by Mr. Lewis to handle the 30,000 cfm of air required to comfortably cool the market's huge main floor sales area. This area boasts 17,200 sq. ft. of floor space and a ceiling which arches 30 feet above the floor level. This vast expanse is unbroken by columns, pillars, partitions, or any other type of support.

Patented Air Diffuser

The diffuser is located at the edge of the ceiling midway down the side of the store which is presently flanked by the candy shop. In fact the three 30-hp G-E condensing units which provide the refrigeration for this system are located on the second floor above the candy shop.

Cooled air is delivered from a central plant type conditioner through a short duct to the patented diffuser, which has an overall diameter of 12 feet and a cone diameter of 9 feet 7 inches. The diffuser is so designed that it directs the air across the full width of the ceiling area, down the far wall, back across the floor level, and up the other wall into the return grill which is located just beneath the diffuser cone.

Before being recirculated into the market area, this return air is drawn through a bank of 32 filters, eight units wide and four units high. This cleansing of the air is extremely important in order to keep dust and lint arising from the constant stream of customers from settling on the exposed produce in the open display cases. Fresh air is mixed with the recirculated air.

Exhaust Fans Needed

A number of exhaust fan systems remove foul and warm air from various parts of the store, particularly from "fryolators," toilets, meat cutting rooms, bake oven space, etc.

That's the story of the refrigeration equipment used in just one of the truly "super" markets which are beginning to make their rather spectacular appearance on the American retail merchandising scene. And it's a story calculated to carry a sequel of both profit and prestige to the refrigeration organizations capable of handling similar applications in the other markets of this type which are sure to come.

AIR DIFFUSION . . .

Continued from page 27

scientifically designed air diffusers. Comparing old refrigerating methods of the meat packing and frozen food industries with the new will make this apparent.

Until recent years, preparing, chilling, and holding rooms were normally refrigerated by coil banks located along walls or in overhead bunkers. In such installations, relative humidity depends upon coil location, size, and temperature.

Air, circulated by gravity, seldom receives proper distribution. Although the major portion of the refrigeration load is from heat-leakage through walls, internal heat adds materially to the load and results in uneven distribution of this gravity-circulated air.

The unit cooler, equipped with highly efficient air diffusers, is a de-

A new resin, known as BCM, announced by du Pont, may find a use in structural panels for refrigerators, washing machines, and other similar applications.







In tests which are now being made, the liquid resin is being used chiefly with glass fabric laminates, although it may also be applied to paper, hemp, wood and various cloths. In the cured state, it is said to be without odor and resistant to most organic materials.

cided improvement over the coil-bank system. By distributing air in a perfectly controlled low-velocity pattern, these diffusers equalize temperature and humidity throughout the room, and eliminate air stratification and stagnant air pockets.

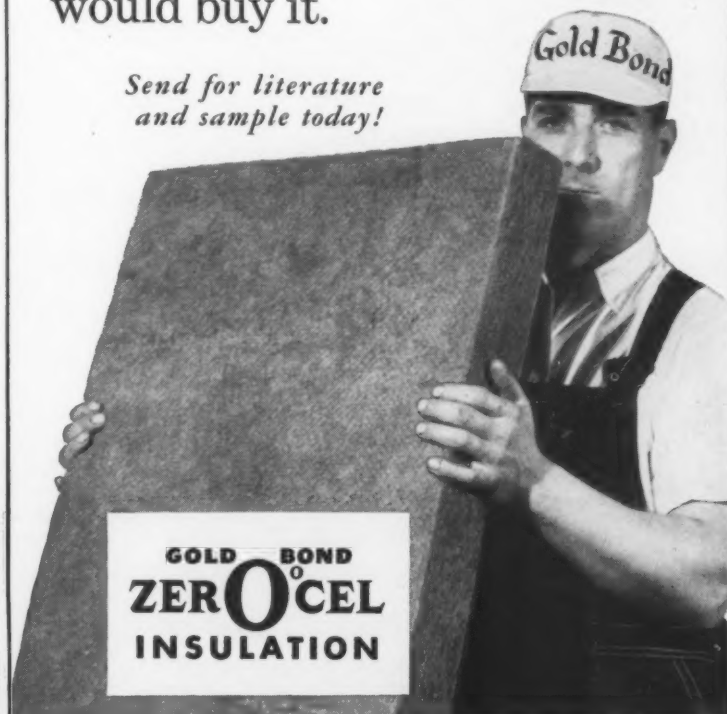
Especially applicable to such installations is the scientifically designed and patented air diffuser known as the "Anemostat." Long used in all types of refrigerating, ventilating, air conditioning, and heating systems—nearly 1,000,000 of these devices have been installed—the Anemostat has been especially adapted to the critical needs of meat packing and frozen food plants.

The device consists of a series of conical-shaped members assembled in definite relation to one another. The device is attached to the air-duct outlet and, due to its unique and exclusive features, the velocity of primary incoming air discharged through it into a refrigerator room is

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instantly reduced by expansion within the cones.

Scientific design of the cones also causes counter-currents of room air to be siphoned into the Anemostat. These multiple counter-currents carry room air, equal to about 35 percent of the incoming air, into the diffuser, where it is mixed with the incoming air stream *before recirculation*.

These two actions, air-expansion and air-siphoning, result in a pre-mixing *within the diffuser* of air supplied by the duct and air drawn from the room. The pre-mixed air

then leaves the diffuser in a predetermined pattern and forms "pressure blankets" which slowly settle on the room air below the device.

Thus temperature and humidity are equalized throughout the refrigerated room, dehydrating drafts are eliminated, and air-stratification and pockets of stagnant air are prevented.

In addition to materially improving meat packing and frozen food processes, duct-outlet systems equipped with Anemostats conserve valuable space, reduce operating costs, and require little maintenance.

COMFORT COOLING . . .

Continued from page 32

equipment will have some surplus capacity on those afternoons when the temperature remains below the design conditions. Thus, it is probable that there may be sufficient surplus capacity on several Saturday afternoons to take care of at least a part of the load due to the extra people, thereby helping justify the lower initial investment.

FRESH AIR: The amount of fresh air to be brought into a cooled enclosure for ventilation purposes is also an arbitrary matter. The chief functions of the fresh air are (1) to replace the oxygen consumed by hu-



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man respiration and (2) to impart a feeling of freshness and vitality to the indoor air by diluting impurities arising from body odors, cooking, smoking, and other indoor activities. The amount of fresh air required to replace consumed oxygen is small compared to the amount required for restoring the vigor of the indoor air. In fact, we have noted that even if no fresh air be supplied mechanically, the process of natural infiltration will ordinarily supply sufficient oxygen to take care of the respiration requirement.

Now, the fresh air supplied to a cooled enclosure need not necessarily be outdoor air, but may be recovered indoor air. Whenever outdoor air is introduced, an equivalent volume of cooled indoor air must be exhausted, resulting in an increased heat gain. By using equipment to remove the impurities entrained in the indoor air, it is possible to minimize the amount of outdoor air required, thereby reducing the heat gain, and resulting in a decrease in equipment installation and operating costs.

Impurities in the air are either in a solid state, e.g., dust, bacteria, and smoke, or in a gaseous state, as is the case with odorous impurities. The

former may be removed from the air by the use of filters and electrostatic precipitators, while the latter may be removed by the chemical process of *absorption*. Chemical absorption utilizes a substance such as activated carbon, which has the property of attracting and clinging to traces of foreign gases in an air stream. The attracted gases may be removed by heating the carbon, thereby causing it to be reactivated.

Obviously, the equipment involved in providing effective cleaning for indoor air is rather extensive, and needs replacement or reactivation at definite intervals in order to continue to operate at top efficiency. For this reason, its advantages become more apparent in the larger installations, where the amount of heat saved assumes considerable proportions. In small installations, it is customary to dispense with any air treatment other than the filtering of either the total air supply or only the outdoor air.

The amount of outdoor air introduced is usually based on the number of people in an enclosure, and is adjusted to the estimated amount of smoking and other air-contaminating activities anticipated within the enclosure. The following recommendations may be used as a guide:

Application	Recommended CFM
Auditoriums (no smoking)	6-8
Barber shops	10-15
Offices (general)	12-15
Offices (private)	20-25
Conference rooms	25-30
Retail stores	10-15
Restaurants	15-20
Cocktail lounges	20-25

When the number of people in an enclosure is unduly small, the amount of outdoor air based on the number of people may calculate as an impractically small amount. In this case, it is desirable to maintain the fresh air supply at approximately 15% of the total air supply. Also, whenever fresh air is supplied to a cooling unit by means of a duct, it is advisable to make the duct large enough to handle the total air supply, so that on mild days indoor cooling may be provided by ventilation only, without the use of the refrigerating plant. When a full capacity fresh air duct is used, the actual amount of air supplied at any given time is controlled by means of a damper.

ASRE TO HELP EVALUATE TECHNICAL CURRICULA

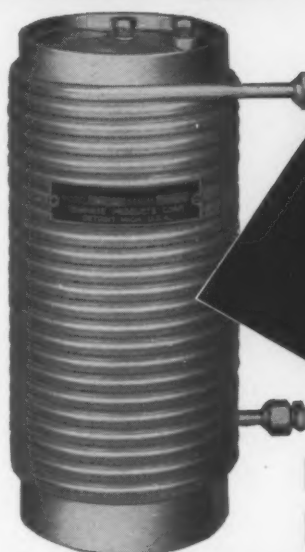
For the purpose of establishing more uniform evaluation of technical institute curricula in the refrigeration field, the American Society of Refrigerating Engineers has just appointed eight members of its education committee as regional coordinators to cooperate with the Engineering Council for Professional Development.

In making this announcement, Dr. Richard C. Jordan, Chairman of the A.S.R.E. Education Committee, called

attention to the fact that a technical institute program is classed as one technical in nature but intermediate between high schools and vocational schools on the one side and engineering schools on the other.

The purpose of such a program is to prepare individuals for positions auxiliary to those of engineering. Such curricula are usually shorter and more intensive than collegiate engineering curricula, but do not include artisanship. A variety of educational institutions offer technical institute programs of this type.

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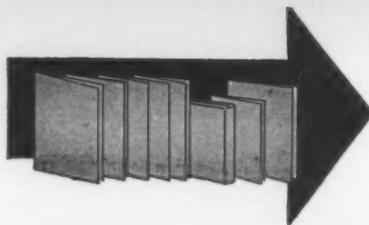
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The publications listed below are available to readers without charge. Simply list on the postcard provided in this issue the numbers of the items you wish to receive, and send it to **THE REFRIGERATION INDUSTRY**, 1240 Ontario Street, Cleveland 13, Ohio. Your requests will then be forwarded directly to the companies concerned.

341—Locker Plants . . . A 20-page booklet devoted to a discussion of the frozen food locker industry and offering detailed information on plant construction, equipment, and operation. Illustrated liberally with photographs and floor plans. Available from Dole Refrigerating Co.

342—Liquid Pumps . . . Catalog B346 with four pages of information and data on a line of vertically split-case, multi-stage, high pressure centrifugal pumps for use on such applications as ice water or brine circulation. Available from Economy Pumps, Inc.

343—Cold Diffusers . . . A 16-page booklet, liberally illustrated, discussing varied applications for a line of cold diffusers ranging from small ceiling-suspended types to large floor-mounted units. Available from Carrier Corp.

344—Thermometers . . . Two new bulletins (Nos. 46-2 and 46-3) describing and illustrating outstanding features of the line of 4, 7, 9, and 12-inch thermometers manufactured by Palmer Thermometers, Inc.

345—Seals and Valve Plates . . . Forty-one new applications of products of Chicago Seal Co. are listed in this 8-page bulletin, which also gives detailed specifications, illustrations, and list prices of the company's line of seals and valve plates.

346—Portable Coolers . . . A new 4-page catalog describing and illustrating the "Arctic Hamper" portable refrigerator, using dry or natural ice, for carrying and storing perishable foods. Available from Jewett Associates.

347—Water Cooler . . . A folder illustrating and giving complete specifications of the Model OP-10 "Oasis" electric water cooler manufactured by Ebco Mfg. Co.

348—Ammonia Valves . . . Catalog No. 65 containing detailed data, prices, and other specifications of ammonia shut-off, hand expansion, purge, relief, and check valves, and accessories for ammonia refrigeration systems. Available from Henry Valve Co.

349—Filter Test . . . Bulletins No. 200 B-1 and 100 E-1 outlining in detail a new visual efficiency test for panel-type air filters. Available from Farr Co.



..... before it becomes dangerous!

VISOLEAK detects even the smallest leaks before they cause damage to expensive refrigeration systems. Years of use prove it safe, economical, easy to use.

NEW CHARGING SET

The **VISOLEAK** Charging Set was developed to inject **VISOLEAK**, add refrigerant oil or re-charge sealed units. For use on all types of refrigeration systems without danger of introducing air or foreign matter.

Charging Set—complete with hoses \$7.50
Filler only—without hoses 6.00

See your refrigeration supply jobber or write for complete information.

WESTERN THERMAL EQUIPMENT CO.

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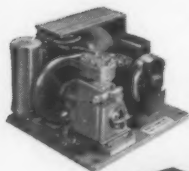
TAMPA WHOLESALE CHANGES FIRM NAME

Graves Brothers Refrigeration Supplies, Inc. is the new firm name of the former Graves Bros. Co., Tampa (Fla.) refrigeration supplies wholesaler, which was recently incorporated. F. L. Graves is president and R. M. Graves secretary of the firm, which is located at 950 Twiggs St., Tampa.

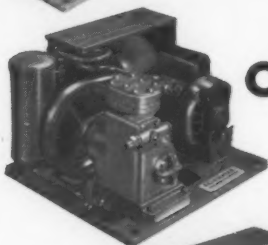
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Performance, price and an easily accessible supply point are certainly important factors to the buyer of commercial condensing units . . . and Kelvinator is the best bet for getting all three!

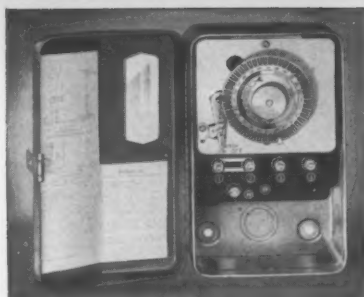
Backed by more than 30 years experience in designing, building and engineering the development of commercial refrigeration, Kelvinator offers full assurance of dependable performance. A network of 50 strategically located depots throughout the nation will solve your problems of *where* to buy—and Kelvinator's enviable reputation in the condensing unit field will assure you *what* to buy.

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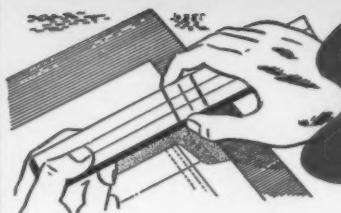
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New PRODUCTS

For further information on any of these products, simply list the key number at the head of each item on the special post card enclosed with this issue.

Home Freezer • • • • P-122

Product: Vertical, kitchen-type home freezer (Model VHF-7).

Manufacturer: Norge Division, Borg-Warner Corp., Detroit.

Features: Six-compartment, six-door freezer with 6.82-cu. ft. capacity.



Holds approximately 240 pounds of frozen foods. All freezer shelves are refrigerated. Powered by a 1/2-hp. hermetically sealed "Rollator" condensing unit. Interior is porcelain enamel, exterior is "Norgloss" finish. Etched space is provided on aluminum compartment doors for writing in the type of food placed in each compartment.

Frozen Food Cabinets • P-123

Product: Two models of frozen food cabinets designed particularly for institutions, small commercial establishments, and farms.

Manufacturer: York Corp., York, Pa.

Features: Larger unit (see photo) has capacity of 33 cu. ft. and will hold up to 1300 pounds of frozen food.

Upright model with front opening doors and condensing unit and controls located on top. Powered by 1/2-hp motor. Equipped with warning



bell to guard against high temperatures and pilot light which goes out when power supply is broken. Measures approximately 6 feet high, 5 feet wide, and 34 inches deep.

Smaller unit has capacity of 16 1/2 cu. ft. Horizontal type with two extra large access lids. Movable partitions in storage compartment. Powered by 1/3-hp unit. Measures about 6 feet long, 3 feet high, and 29 inches deep.

Both units are equipped with quick-freezing compartments and are finished on interior with matte-surfaced aluminum and exterior with white baked-on enamel.

Beverage Cooler • • • P-124

Product: "California Chill-Aire" all-aluminum dry beverage cooler.

Manufacturer: Buxton, Inc., Los Angeles.

Features: Available in 5 and 8-foot lengths, the former holding 22 cases and the latter 33 cases of 12-ounce bottles. Aluminum inside and out; glass insulation; curved doors which open at a touch and close automatically; adjustable dividers; over size cooling unit.

Home Freezer • • • • P-125

Product: Model F-1000 home freezer.

Manufacturer: Refrigeration Division, Whiting Corp., Harvey, Ill.

Features: A 4½-cu. ft. unit with capacity for approximately 175



pounds of frozen foods. Measures 36 inches high, 27 inches wide, and 32 inches long. Insulated with 4 to 5 inches of Fiberglass. Powered by a ⅓-hp sealed unit, it maintains a temperature of 0 F. Finished in white Duco enamel. Retail price, \$239.50.

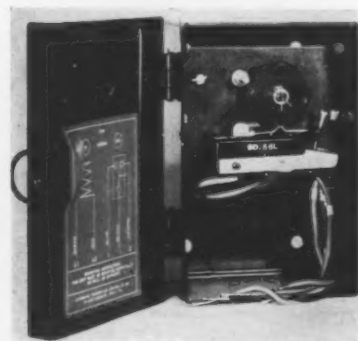
Model F-2000, and 11-cu. ft. freezer with a food capacity of 475 pounds is powered by a ⅓-hp sealed unit and is 60 inches long. Retail price, \$379.50.

Defrosting Timer • • • • P-126

Product: Timer for automatic hot-gas defrosting of refrigeration systems.

Manufacturer: Automatic Temperature Control Co., Inc., Philadelphia.

Features: Repeat cycle timer



geared for 6-hour cycle. Timer motor drives gear which may hold as many as four tripping pins for actuating a single-pole, double-throw precision switch. Readily adjusted

by turning screw. Switch may be swung from one position to another by hand to check operation. Adaptable to systems requiring one defrost every 6 hours, every 3 hours, or every 90 minutes.

Cabinet Lid • • • • P-127

Product: All-rubber lid for refrigerator cabinets.

Manufacturer: B. F. Goodrich Co., Akron, Ohio.

Features: Unbreakable and will not permanently bend. Fabric reinforced rubber hinge which is non-corrosive,



needs no lubrication, and cannot be sprung. Unaffected by moisture,



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Now you can *spray, brush, squeegee or trowel COLD* adhesive for insulation blocks and vapor-seals—and get a better job quicker, easier, at less labor cost.

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5. Sets tacky and ductile—not brittle.
6. Adheres to any type of dry surface; combined with aluminous cement, it adheres to damp walls and floors.
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8. No cracks from vibration or stresses.

LAYKOLD WEATHERCOAT, troweled on, seals insulation permanently moisture-proof, indoors or outdoors. LAYKOLD MASTIC covers any type of sub-floor—is impervious, easy-to-clean, enduring, waterproof and noiseless—the ideal refrigeration floor.

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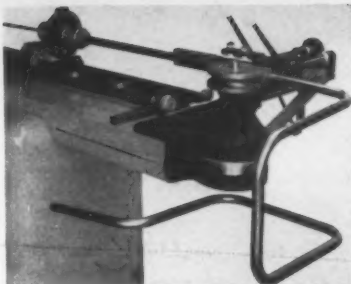
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processing solutions, syrups, milk products, or fats. Forms smooth top surface with no protruding hinges, crevices, or channel strips. Position of lift knobs permits either section to swing back almost flat against the opposite side.

Tube Bender • • • • P-128

Product: Leonard-Douglas Bendermaster, for production bending operations requiring multiple bends.

Manufacturer: Leonard Precision Products Co., Garden Grove, Calif.



Features: Hydraulically operated and has capacity of $\frac{3}{8}$ -inch to $1\frac{1}{2}$ -inch ferrous or non ferrous tubing. From one to 10 bends can be made in

a single length of tubing with only one setting.

Refrigerator Cover • • P-129

Product: Padded refrigerator cover to protect cabinets during delivery.

Manufacturer: New Haven Quilt & Pad Co., New Haven, Conn.

Features: Adjustable to refrigerators from 4 to 10-cu. ft. in size, completely covering the cabinet. Cross-stitched in squares to prevent tears from spreading. Waterproof canvas outside and moleskin inside. Fitted with carrying harness and buckles.



LOW TEMPERATURE
DEFROSTING

*Automatic
as clockwork*

THERMOBANK EVAPORATOR
IN FREEZER ROOM OF A
PACKING PLANT

THERMOBANK

... requires no attention

Defrosting is completely automatic and on a time schedule. No hand valves need be opened or closed; no coils need be scraped; no goods need be removed.

... Maintains peak efficiency

Never loaded with frost, coils operate at peak efficiency always. Power is saved. Temperature fluctuations are minimized.

HOW IT WORKS—The THERMOBANK System consists essentially of a forced convection cooling unit, time controls and a heat reservoir. A portion of the heat extracted during the refrigeration cycle is "Banked" in the reservoir from which it is released to the refrigerant during the defrost cycle.

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HEAT
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EQUIPMENT

KRAMER-TRENTON Co.

TRENTON 5

NEW JERSEY

Test Instrument • • • P-130

Product: Aerovox Model 76 resistance-capacitance bridge for use on the job or in the shop.

Manufacturer: Aerovox Corp., New Bedford, Mass.

Features: Simplicity of operation, high degree of accuracy, moderate



price. Measures capacitance from 100 mmf to 200 mfd in six ranges; resistance from 10 ohms to 200 megohms in six ranges; power factor from 0 to 50%. Provides dc polarizing potential for leakage measurements, and checks leakage of electrolytic capacitors or insulation resistance of paper or mica capacitors.

Hand Truck • • • • • P-131

Product: Twin-unit hand truck for handling refrigerators and other appliances.

Manufacturer: Aircraft Mechanics, Inc., Colorado Springs, Colo.

Features: Constructed of tubular steel with aluminum wheels using 6-

inch x 2.50 cushion rubber tires. Swivel wheel on one unit facilitates operation in crowded quarters. Height 56 inches, width 25½ inches.

Home Mixer • • • • • P-132

Product: Cylindrical cast aluminum case fitted with charged bulb for home mixing of ice cream and other frozen desserts.



Manufacturer: Ralmac Corp., Grand Rapids, Mich.

Features: Cylinder height, 9½ in.; capacity, 1 qt. Insertion of a charged bulb in bottom of cylinder creates pressure which aerates as well as mixes ingredients. Mixture is then ejected into refrigerator tray and frozen.

Counter Cooler • • • P-133

Product: Refrigerated units designed to give druggist added space for cold foods or biologicals.



Manufacturer: Liquid Carbonic Corp., Chicago.

Features: Designed for under counter or backbar installation, cabinet measures 2 feet wide and has 33-inch-high working surface. Capacity is 4½-cu. ft. Stainless steel inside and out, unit is refrigerated by direct expansion and insulated by pure corkboard. Fingertip door latch and recessed base provide ready access.

Parts for Coldspot Refrigerator Pumps

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| No. 501—Size No. 1 (34) 1½" Pump Valve Blade, \$1.50 set. | No. 751—Drive Coupling, \$.22 each. |
| No. 502—Size No. 2 (35-39) 1¼" Pump Valve Blade, \$1.50 set. | No. 825—Dome Gasket, \$.13 each. |
| No. 503—Size No. 3 (35-39) 1½" Pump Valve Blade, \$1.50 set. | No. 1001—Knock-out Tool for check valve seat, \$2.50 each. |
| No. 504—Size No. 4 (35-39) 1" Pump Valve Blade, \$1.50 set. | No. 1002—Drive-in Tool for check valve seat, \$2.50 each. |
| No. 505—Check Valve Seat, \$.75 each. | Cat. No. 510—Main Seal Bearings for ½" and ¾" shafts, \$2.00 each. |
| No. 506—Check Wafer, \$.10 each. | Cat. No. 511—Main Seal Bearing Drive in Tools for ½" and ¾" shafts, \$2.50 each. |
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LIQUID SYSTEMS . . .

Continued from page 38

the higher head pressure may lead to motor trouble, for when a motor draws more than its recommended wattage its normal temperature rises. Fuses and similar protection devices are designed to stop a motor when the wattage reaches a certain point, but continued operation at a wattage slightly below this point may eventually cause motor failure. Temperature type protectors are much more

effective for this reason than current (hot wire) devices.

Low Head Pressure:

Low head pressure may be the result of any one or more of the following causes:

(1) Shortage of refrigerant. Refrigerant shortage results in "starved" evaporator conditions with reduced evaporation which, with constant speed compressors, causes operation at lower than average head pressures due to the lesser volume of

refrigerant to be condensed.

(2) Stuck open needle in expansion valve or float valve. This tends to permit the pressures on the high and low sides to equalize with resultant low head pressure.

(3) Broken or leaking flapper valves which reduce the capacity of the compressor to pump, with consequent lesser load on the condenser.

(4) Bad suction valves and loose pistons have the same effect.

(5) Low vacuum operation or setting of the expansion valve or stuck shut valve results in a starved or light loaded evaporator or a low evaporation rate with low load on the high side and condenser. A badly plugged or frozen valve will show similar symptoms.

(6) Condensing unit operating in a cold room with cold ambient air temperature or very cold cooling water.

(7) If an oil separator is being used, the float may be stuck open resulting in short-circuiting of high pressure vapor to the low side.

To correct these troubles:

For (1) locate the leak, repair, and recharge the system. Whenever a

MODERN REFRIGERATOR HARDWARE



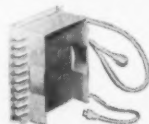
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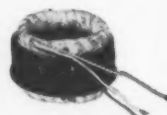
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Carrene No. 1 (list)
\$7.75 per gallon in
10 gal. lots

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shortage of refrigerant shows up on any system, always go over the entire system for leaks and eliminate them. One further point, DON'T stop looking for leaks after you find the first one. There always may be more than one leak develop in a system. The competent service engineer will thoroughly check an entire system on which a shortage of refrigerant develops.

For (2), locate which valve is stuck and replace it.

For (3), replace the ailing compressor valve.

For (4), check the compressor for capacity and ability to hold a vacuum. See compressor testing covered previously.

For (5) check valve setting and compound gauge on compressor. Readjust the valve as required. If readjusting the valve (opening wider) doesn't cause a rise in back pressure, check for frozen moisture plugging flow through the orifice and needle. If stopping the condensing unit and warming up the valve doesn't free the flow of refrigerant and cause a rise in the low side pressure, possibly the valve inlet screen is plugged. Pump

down the low side and disconnect the liquid line at the valve and check the screen. If the screen is clean, the valve may have lost its thermostatic power element charge. Replace the valve only as a final correction. Many expansion valves are replaced when there is nothing actually wrong with them.

For (6), if operation of the fixture is satisfactory, no change is required. However, if storage temperatures are erratic, heat and room or location to raise the room temperature or relocate condensing unit in


a heated room. If a water cooled machine, readjust the water control valve for higher head pressure.

For (7), shut-off or pump down the oil separator, remove the float assembly and free the stuck float or replace the separator.

High Suction Pressure:

To check for high suction pressure, install a compound gauge on the compressor suction service valve.

High suction pressure may be caused by: (1) an expansion valve



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open too wide, (2) a heavily loaded fixture evaporator, (3) dirt plugging the suction screen or strainer in the compressor, and (4) inefficient suction or discharge valves in the compressor.

An expansion valve open too wide generally results in flooding the evaporator and frosting back the suction line outside the fixture with substantial evaporation occurring in the exposed suction line. This produces higher than normal back pressures. The correction is to close the expansion valve to stop the frost line

within the fixture.

If the fixture has just taken on a heavy refrigeration such as a peak or heavy draw of water through it, the back pressure will rise higher than normal temporarily but will reduce as soon as the load on the fixture is reduced.

If the condensing unit runs on too long "on" cycles, or continuously at high suction pressure, attach a compound gauge to the compressor suction service valve and check for a plugged compressor suction screen.

The compressor suction screen is

located between the suction service valve and the compressor crankcase. Start the compressor. Close the suction service valve all the way, which will result in a vacuum being pulled on the crankcase of the compressor, and then stop the unit. If the gauge reading drops to a vacuum as soon as the suction valve is closed, the strainer is not plugged.

However, if the compressor screen is plugged, the reading on the suction gauge will slowly drop to vacuum, because even with a plugged screen there will always be some leak through. Always test for plugged strainer screen before checking for leaking flapper valves. Checking for leaking flapper valves has been covered in a previous section.

Low Suction Pressure:

Low suction pressure may be caused by any of the following: (1) refrigerant shortage, (2) expansion valve closed off too far, (3) stuck shut float valves, (4) oil logged evaporator, (5) partially plugged expansion valve or float valve strainer, or (6) moisture frozen at the expansion



On the shoulder of every cylinder of VIRGINIA Refrigerant* a date is stamped—the last hydrostatic test date of that cylinder. I. C. C. regulations require that cylinders be tested hydrostatically once every five years. Some cylinders show several test dates . . . always look for the latest. If this last date is more than five years old, the cylinder should not be used again until it is retested by certified equipment and approved for continued service.

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valve or float valve needle.

When the suction pressure is abnormally low, first check for shortage of refrigerant. Unless a system has sufficient refrigerant charge, no amount of adjusting of valves or controls will correct the faulty operation of the fixture. Check for leaks on both the low and high sides of the system if found short of refrigerant.

If the expansion valve is closed off too far, the evaporator will be "starved" and there will be insufficient evaporation of refrigerant to maintain normal suction pressure. Open up the valve to obtain normal frost line.

Float Valve Stuck

A stuck shut float valve will result in no refrigeration on its evaporator. If the float is stuck, or sticking, it should be replaced, for even though it may be freed by tapping lightly it may cause repeat trouble by sticking again.

If the refrigerant shortage has resulted in oil logging of the evaporator, the float will have to be removed and the oil withdrawn by a small hand pump, or the entire "boiler" removed and the oil poured out. Be sure to check the compressor for proper oil level on any system which has developed an oil logged evaporator condition. Add oil to the crankcase as required.

Valve Strainer Plugged

If the valve strainer plugs, the restriction of flow may be sufficient to cause starved evaporator conditions with lower than normal suction pressures. Remove the compressor suction screen and clean or replace.

All expansion valves and float valves have a screen at the inlet connection to catch any filings or particles of dirt that may get to it. This screen prevents them from getting under the valve seat and causing erratic operation of the valve with failure to properly control refrigerant flow to the evaporator.

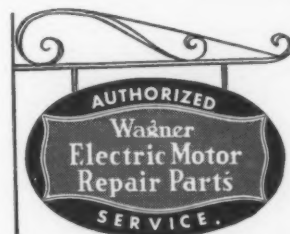
Moisture frozen at the expansion valve or float valve needle will restrict the flow and may completely stop it, resulting in substantially lower than normal suction pressures. Moisture gives the same symptoms as a plugged strainer. By heating the valve, the ice may be melted and a moisture restriction freed.



- 1 Wagner knows brushes.
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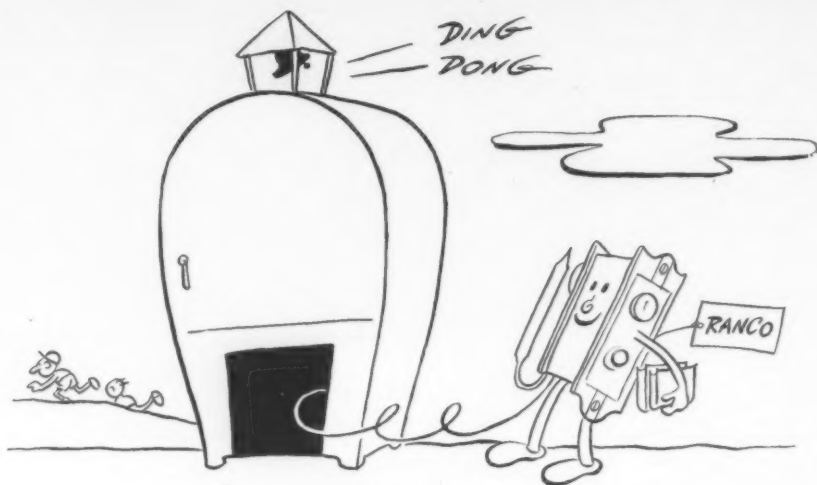
Wagner designs and builds each motor part to assure dependable service for which Wagner motors are world-famous. When it's a Wagner motor, be sure to put in genuine Wagner motor parts—available at 325 authorized service stations displaying this sign.



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Big or small, there is a Ranco Control for practically every cooling or freezing box—either an exact or general replacement.

Your jobber is thoroughly familiar with the complete Ranco line of controls—if you are in doubt he can advise you as to the right control to install. If you have an unusual problem, write to us—our engineers will gladly help you solve it.



TYPE O-1408

Ranco Inc.

COLUMBUS 1, OHIO

"Let's share our knowledge—exchange our experience"

Here's how

THE SERVICE MAN'S DEPARTMENT

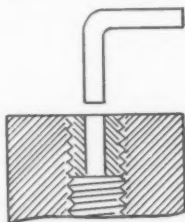
Emergency Servicing of Sealed Machines

Here is a servicing suggestion on hermetically sealed units that was submitted by Joe W. Langford, of Waco, Texas. In presenting it to you, we would like to note that, while a procedure such as this might be effective during material shortages as a means of providing refrigeration, it should not be used as a standard practice in repairing sealed units.

Mr. Langford's suggestion is:

"Hermetically sealed units that have been stuck because of dirty condensers or faulty cycling switches

REMOVING broken ends of brass pipe or fitting from threaded holes with a standard type of extractor is usually difficult because the taper of the extractor causes



the broken piece to wedge more firmly in the hole.

I have had good results by selecting a size of Allen wrench that almost (but not quite) fits into the hole, driving it into the hole and backing the piece out.

Edward A. Wenk, New York City

can easily be put back into operation if the cylinder or blades aren't damaged.

"A. After the proper service valve has been attached to the low side (if necessary, sweat in a copper tee and a small receiver valve) pull a 25 to 30-inch vacuum on the entire system. This is best done with an old rotary compressor or vacuum pump.

Edited by
Warren W. Farr

FIVE DOLLARS REWARD

WILL be paid by
The Refrigeration Industry
for any information on installation or servicing procedures and short-cuts accepted for publication in its *HERE'S HOW* department. Send your suggestions on shop equipment and methods, tools, or other ideas to

HERE'S HOW EDITOR
THE
REFRIGERATION INDUSTRY
1240 ONTARIO STREET
CLEVELAND 13, OHIO

"B. By means of the oil injecting device described in the *Here's How* section of the December, 1945 issue of *The Refrigeration Industry* (p. 42), add a mixture of 8 ounces of Freon oil (300 viscosity) and two tablespoons-full of Xylene to the unit.

"C. The gas bottle valve is opened wide to give plenty of pressure behind the oil and solvent in order to get to the blades. Again pull a good vacuum and as soon as the gauge reads 25 inches or better *plug in* the motor, making short quick contacts in the outlet.

"If the compressor fails to start, repeat 'C', but using 220 volt current and still employing the quick contact method. After the compressor has been run in carefully for several hours with only a small refrigerant charge, gas is put in by the frost-line method.

"The customer, of course, should be informed of the manufacturer's service policy, as well as the terms on which your work is being carried out."

Cold Facts on Steam Cleaning

In all steam cleaning work the choice of the proper type of cleaning material is the principal factor in obtaining the desired speed and thoroughness of cleaning. Although steam alone has some cleaning powers due to its heat and pressure, the addition of the right cleaning material provides a combination of heat, pressure

WHEN using solder fittings having a feed hole, I always try to install the fitting with the holes on



FEED HOLES

the bottom so that the solder drains back into the holes when the heat is removed instead of running out of the fitting.

Edward A. Wenk, New York City

and detergency which is capable of removing almost any type of deposit.

What are the desired qualities of a steam cleaning material?

1. It should clean—that is, it should have good emulsifying action on the greases and oils which hold the dirt to the surface. To speed emulsification, the material should have effective wetting out action, for wetting ability assists the solution to penetrate into and under the soil.

2. It should be readily soluble—it should go into solution quickly and completely. Total dissolution means that all of the cleaning value of the material is utilized and also, in coil-type steam generating equipment, it prevents possible clogging of the strainer and water feed lines.

3. Free rinsing is another impor-

tant requirement. In most steam cleaning work, surfaces are rinsed with plain steam or not at all. If heavy deposits of alkali remain on the cleaned area, the whitish streaked effect resulting is undesirable from an appearance standpoint. When a free rinsing steam cleaning material is employed the cleaner is easily removed with a plain steam blow-off.

4. It should be as odorless as possible, and non-irritating to the eyes and the membranes of the nose and throat.

5. If it is used in coil-type steam generating equipment, the cleaning material should have a minimum tendency to deposit in the coils.

Looking for Trouble:

No. 5 Evaporator Sluggish

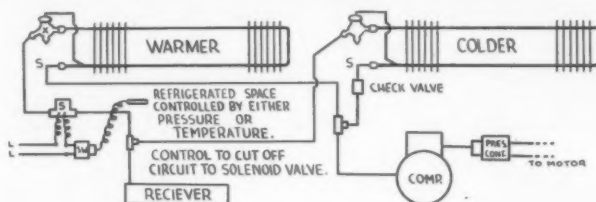
When the evaporator does not seem to be fully active, here are some points to check:

1. Refrigerant charge low.
2. Expansion valve sticks closed.
3. Clogged expansion valve screen.
4. Obstruction in liquid line.
5. Liquid line too small or too long.

WHEN two coils are operated at different temperatures and connected to one machine which is controlled by a standard pressure controller, a temperature control and solenoid valve can be used to provide temperature control in the warmer of the two spaces. However, it is necessary to use a check

valve in the suction line at the outlet of the colder coil, to prevent refrigerant from the warmer coil condensing in the lower temperature coil during the off-cycle.

If the check-valve is omitted, it is possible to have liquid slugs enter the compressor at start-up periods, with possible serious damage to the equipment.



6. Moisture in the valve.
7. Expansion valve adjustment.

Don't Kid Yourself

These are easy days for the salesman. The pent-up demand for refrigeration equipment of almost all kinds is so great that you almost have to use a baseball bat to keep customers from taking goods away

from you. Under conditions like these, salesmen can easily be lulled into believing that things will always be this way.

There are plenty of sales today if you pass up the hard-to-sell prospects and just concentrate on the push-overs; but an experienced salesman can tell you that you're in for a terrific shock if you don't work out on a few of these toughies while the working's good.

These hard-to-sell prospects are just as important—and in one respect, more important—for they

RECENTLY I needed a vacuum pump for the shop, and not wanting to buy a new one I made up one using the following equipment that I had in the shop:

Taking two used compressors I had on hand, I mounted one on each side of my grinder, connected them to the shaft by means of flexible couplings, the same type that are used on washing machines. The grinder drives at 3400 r.p.m. The two pumps are connected in series by $\frac{3}{8}$ " copper tubing.

My experience has been that this makes a very good two-stage unit; and in this case, at least, it didn't cost much to construct.

Lee A. Griffith, Norwood, Mass.

represent more nearly the type of persons you'll have to sell when the change comes from a sellers' market to a buyers' market. So call on those hard-to-sell prospects, too, and give them your best. You'll be keeping your selling tools in good condition for the time when you'll need them—and that time is sure to come.

STANGARD

Prime Surface

COLD PLATES

For Maximum Refrigerating Efficiency



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ARMY DEVELOPS NEW HUMIDITY RECORDERS

Two types of instruments for remote measurement of humidity at room temperatures and at subzero temperatures have been developed by the U. S. Army, according to a report released by the Office of the Publication Board, Department of Commerce.

The report was prepared by Marvin Van Dilla, Despina Malakos, and John E. Fitzgerald, Jr., of the Quartermaster Corps Climatic Research Laboratory, Lawrence, Mass.

For measuring humidity at room temperatures, a thermoelectric psychrometer was developed. It consists of a pair of fine wire thermocouples,

FRIGIDAIRE DIVISION of General Motors Corp. has concluded an extensive and all-inclusive sales, service and business management training program with a special comptrollers' school in Dayton. More than 500 key men from the U.S., Canada and overseas participated in the training program, which comprised seven individual schools.

Training courses for the series of sales, service and business management schools included lectures, demonstrations, exhibitions, diagrams, factory tours, motion pictures and open forum discussions. They covered products, sales organizations, sales promotion, advertising, store location and planning, market research, business administration, credit, collections and financial management.

Employing and training salesmen, sales stimulation, rural and special markets, service and franchising were also incorporated into the school curriculum. The schools were supervised by Ellsworth Gilbert, sales promotion manager.

Field training programs will carry the same information to the sales, service and business management personnel of Frigidaire dealerships throughout the country.

one of which is continuously wetted by a wick.

This device permits remote reading of humidity without requiring forced air movement past the wet bulb, as do mercury-in-glass psychrometers. For this reason it is particularly useful for measuring relative humidity in small enclosed spaces.

The other instrument is an electronic dew point recorder, designed for the measurement of humidities at subzero temperatures. This recorder automatically adjusts the temperature of a small mirror exposed to the air so that it is continuously on the verge of being fogged. The mirror tem-

Parts Wholesaling, California Style



California Refrigerator Co., San Francisco parts and supplies wholesaling firm now owned and operated by Gerald S. Robinson, offers this eloquent testimony as to how a modern, progressive wholesaler's place of business should look. These two photographs, taken in the firm's remodeled San Francisco store, show the order counter and a section of the display area.



perature (dew point) and the air temperature are recorded and can be translated into relative humidity.

The temperature of the mirror is maintained by constant cooling with a refrigerant and through variable heating by a radio frequency induction heater.

HUPP TO DO CONTRACT MANUFACTURING WORK

The Hupp Corp., formerly the Hupp Motor Car Co., has abandoned automobile manufacturing to concentrate on "contract manufacturing" for the refrigeration and other basic industries, according to R. S. Geddes, president.

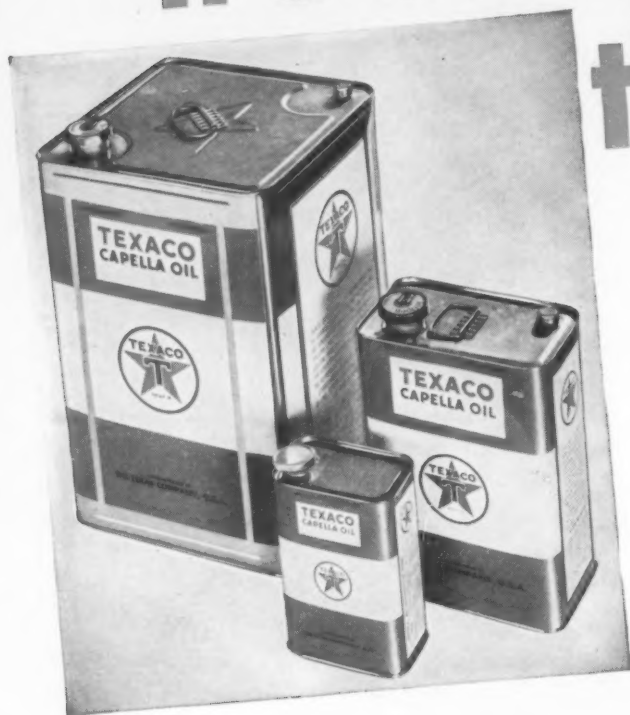
Hupp, operating plants in Detroit and Cleveland, is making parts, sub-assemblies, assemblies and some finished products for the refrigeration, radio, farm implement, automobile and truck industries.

WANT to live electrically? A profusely illustrated 64-page booklet recently issued by the General Electric Co. tells you how.

Designed especially for those people who are thinking seriously of building or remodeling their homes, this full-color publication covers all electrical and appliance aspects of kitchens, laundries, basements, and every other room in the house.

This new booklet, soon to be available through G-E appliance retailers from coast to coast, will be priced at 25 cents per copy.

It's the Oil that does the Business \$\$\$



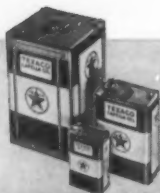
DISTRIBUTORS, dealers and service engineers all do more business with *Texaco Capella Oils* because these oils — O.K.'d by compressor manufacturers — assure smooth, trouble-free operation for all types of compressors, and so build extra sales and profits.

Texaco Capella Oils come to you moisture-free, in *re-sealable* containers that keep them in proper condition. *Capella Oils* are highly stable, have very low pour tests, do not re-act with refrigerants, and resist gumming and sludging. You can get

them in every needed viscosity.

Leading manufacturers of air conditioning and refrigerating units either use, recommend or approve *Capella Oils*. Be guided by this fact in choosing oil for efficient, economical compressor operation.

Order *Texaco Capella Oils* today . . . in convenient 1 qt., 1 gal., and 5 gal. containers. For prompt delivery, just call the nearest of the more than 2300 Texaco distributing plants in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Capella Oils

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT



TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

ABOUT PEOPLE . . .

Continued from page 39

N. C. He will be assisted by O. J. Theobald, Jr. Fred O. Tilton heads the other newly defined southern sales area, operating out of Chattanooga, Tenn. William H. Eastburn heads the company's revamped eastern territory.

James M. Lick has been named resident salesman in Harrisburg, Pa.



for Victor Sales & Supply Co., Inc., Philadelphia parts and supplies wholesaler. While Mr. Lick will reside in Harrisburg, he will travel out from that point on regular trips

in order to thoroughly cover that territory.

Harold C. Hickock, former central district manager for the Elevator

AMINCO OIL SEPARATORS



Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from 1/2 H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

Full descriptive bulletins on request.

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THE PRACTICAL Refrigeration Engineering MANUAL . . . by Harold Smith

XIII. Bakery Refrigeration

PART III

In many bakery installations tanks are often already installed. These tanks were originally used with ice or with ammonia cooling systems. Frequently the owner will insist the existing tank equipment be used. If it is impossible to sell the advantages of the instantaneous-type cooler, the old tank can usually be fitted up to do a good job.

Careful engineering and a considerable amount of revamping of the equipment is required. Old evaporator coils in the tank should always be replaced with new coils or plates. Old ammonia coils of iron pipe construction are usually very rusty and can cause no end of trouble with leaks and scale breaking loose within the pipes.

CAUSES OF LEAKS

Another problem frequently developed when old tanks are used is leaks in the tank or coils resulting from electrolytic action. The possibility of electrolysis increases when copper coils are placed in a tank lined with iron. When electrolytic action develops corrosion is rapid, and leaks become a real problem very quickly.

Everything considered, the greatest insurance of providing an efficient, satisfactory installation lies in the use of new equipment and in the use of an instantaneous type water cooler.

HEAT FROM MIXING

Bakeries use dough mixing machines, consisting of a large hopper in which the ingredients are placed. Inside the hopper, a series of paddles or arms mix and knead the dough. Considerable

heat is developed in this operation, with a corresponding rise in temperature of the dough while in process.

As a means of holding down and controlling the temperature rise to the minimum limits, the mixer is usually enclosed in a jacket with a space between the two units. Cold water is circulated between the jacket and the mixer, to assist in removing the heat.

CONTROLLING THE MIX

Through the use of 35° F. water and flour at a temperature of 70° F. the mixed dough, when taken from the mixer, usually is at a temperature of from 75 to 80° F.

The use of cold water at a fixed uniform temperature assures the baker of a uniform quality of product day after day, and also greatly assists in faster dough mixing by helping to hold the temperature of the mix at a relatively low temperature.

The quantity of dough mixed each day indicates the amount of cold water required in this operation, and the baker should furnish accurate figures on his needs for this purpose.

FERMENTATION ROOM

The dough is removed from the mixer and placed in a room for from two to six hours to allow fermentation to take place. Under controlled conditions the temperature of the room in which fermentation takes place should be close to 80° F., with 70 to 80% relative humidity.

If conditions are not controlled, loss of weight will take place, resulting in a production waste. Depending upon tempera-

division of Westinghouse Electric Corp., has been appointed central district manager of the B. F. Sturtevant Co. division of the company, with headquarters in Pittsburgh.

Ernest S. H. Baars has been appointed an instructor in refrigeration and air conditioning theory at the Milwaukee School of Engineering. Born in Germany and educated both in that country and the U. S., Mr.

Baars left his position as sales and development engineer for Vilter Mfg. Co. to join the school's faculty.

Carl M. Lynge, general works manager of General Electric Co.'s Bridgeport, Conn. plant, has been named manager of manufacturing for G-E's appliance and merchandise department, succeeding W. Stewart Clark, who has retired.

ture conditions and humidity, this loss can become serious and expensive when large quantities of dough are handled.

After fermentation is completed, the doughs are processed for bread, pastries, pie crusts and other products. The bread dough is placed in pans ready for baking; other doughs are prepared for immediate baking, or with pie crusts and pastries, may be placed in the retarder coolers, to be held until ready for use.

COOLING THE BREAD

The baked bread is removed from the ovens and placed in rooms for cooling. Usually a period of from 80 to 120 minutes is required to cool the bread to a temperature of approximately 90° F., which is considered the correct temperature for cutting and wrapping. If the bread cooling room is air conditioned, a temperature close to 70° F. with 80 or 85% relative humidity provides fast cooling and assures a uniform quality product.

If air conditioned cooling rooms are installed the load factors consist of heat leak, people employed, infiltration of air from opening and closing of doors, lights, and of course, the big heat load—the product itself.

COMPLETE DATA NEEDED

The baker must supply the engineer with complete information to enable him to provide the proper equipment to control the temperatures in this room at the desired point. It can be readily seen that the baking industry needs and uses large quantities of refrigeration for efficient economic operation and to insure a uniform quality product throughout the year.

There are, of course, many small neighborhood bakeries whose volume of business does not seem to justify the large in-

vestment required to cover refrigeration in all processes as has been outlined here. However, the small bakeries are all turning to the use of refrigerated water for dough mixing, and the use of coolers and reach-in boxes for storage of material and products.

BAKERIES NEED IT

This equipment is so essential that the baker cannot afford to be without it. Other uses for refrigeration in the baking industry are low temperature storage where frozen raw materials, such as frozen fruits, eggs, milk, etc., are stored.

Many bakeries handling retail sales use refrigerated display cases where products containing cream fillings and other perishable materials are displayed and sold to the retail trade. The baker is a good potential user of refrigeration equipment.

Editor's Note: This concludes the study of refrigeration problems in bakeries. In our following chapters of the Manual we will take up water cooling problems in beverage bottling plants, the cooling of drinking water, and similar types of applications.



Says GASKET JOE

COMPRESSORS FIXED,
THE SEALS ARE TIGHT,
ANOTHER BOX IS
ALMOST RIGHT.
AND YET, MY FRIENDS,
THERE'S SOMETHING MORE.
BEFORE YOU'RE SURE
YOUR JOB IS PAT
YOU'VE GOT TO TAKE A

GANDER AT
THE GASKET
ON THE
COOLER
DOOR.



VALVES — DRIERS STRAINERS

For Refrigeration and Air Conditioning
Sold by leading jobbers in 130 cities

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FARMERS TELL OWN FREEZER SALES STORY

To effect savings in time, food and money, 34 out of 40 farm families not now owning farm freezers plan to buy as soon as the units are available, according to a recent survey by Westinghouse of 63 families living on 59 farms averaging 225 acres. The farms are located in 16 states across the nation producing various types of farm crops.

Farms interviewed in the study fell into three groups of about equal size: 1. those who now use freezers, 2. those who now use locker plants, and 3. those who use no freezing facilities.

Of the 34 families planning to add freezers to present farm equipment, the majority gave as their reason the convenience that a freezer offers in

service for the first time. Freezer users, the survey indicated, are storing more foods than those who use locker storage facilities.

* * *

LOCKER INDUSTRY IN ARKANSAS SURVEYED

A study of the "Operation of Arkansas Frozen-Food Locker Plants" has recently been published by the bureau of research of University of Arkansas. The study was prepared

by W. S. Farris of the bureau of research staff.

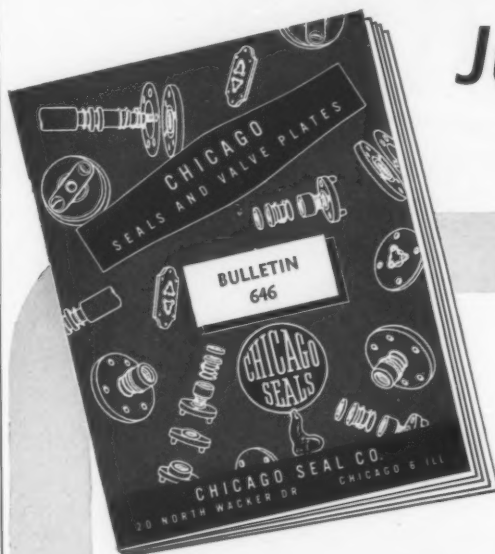
The study deals with the status of the locker plant industry in Arkansas, including operational trends, patronage, facilities, and services offered, rental and service charges, and space requirements for refrigerated rooms. Costs are included for plant investment, electricity, and plant payrolls. Persons interested in obtaining additional information on the study may write to University of Arkansas, Bureau of Research, Fayetteville, Ark.



handling frozen and stored food. Some of the farmers using locker plants at present plan to switch to home freezers, and a few plan to utilize both services, the survey revealed.

Freezer advantages, to farmers now using the units, included: better living through improved year-around quality and variety of food, convenience in having large food stocks readily at hand, economy by eliminating waste, saving of time, and permitting large scale food processing.

Freezers in the general 16 to 25 cu. ft. range are preferred by farmers now using freezers or locker plants, while units of the 6 cu. ft. size range appeal to those planning to begin this



Just Out!

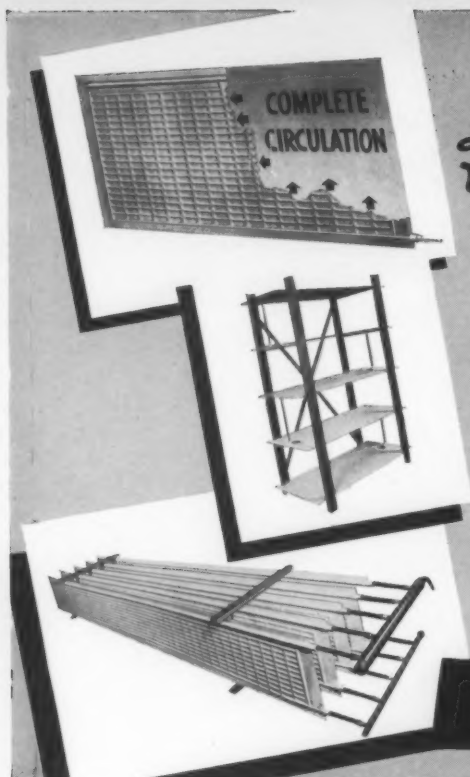
Announcing Bulletin 646

41 NEW MODELS of CHICAGO SEALS and VALVE PLATES

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SEAL CO.**
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—and we mean "COMPLETE SURFACE."

Take a 19" x 108" Hubbell-Yoder Plate for example. That's 2052 square inches of plate area. And every single square inch is actual prime heat pickup surface. You see the interior of the plate is a network of ducts through which the refrigerant circulates, spreading out in all directions so as to form a web of refrigerating element. That's "Complete Surface Freezing."

If you make, sell or use low temperature equipment such as freezer cabinets, locker plant plate banks, sharp freeze shelf stacks, etc., it will certainly pay you to get details on Hubbell-Yoder Plates. They'll step up operating efficiency and reduce operating costs. As the old darkey said, "Dat am no prophecy: dat am a fact." Write, wire or phone.



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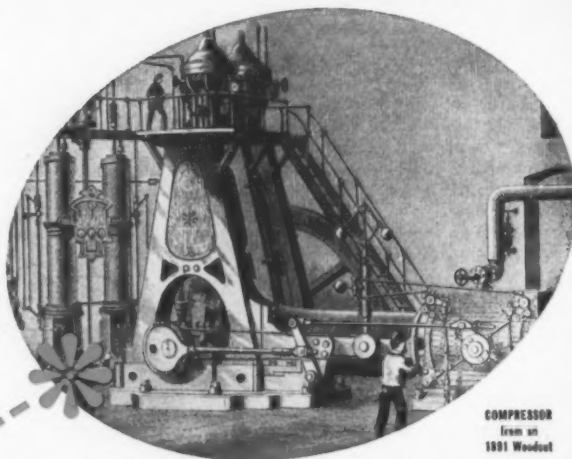
CLEVELAND 2, OHIO

PROGRESS

The Rube Goldberg contraption at the right is, believe it or not, a compressor (circa 1891). Note the comparative size of the men.

Below, for comparison, is Baker's popular F6B Compressor, approximately one-hundredth the size of the inefficient Goliath above. That's progress!

But that's just the beginning. Right now Baker is engineering new products which will again raise the standards of the entire refrigeration industry. Watch Baker for progress. Expect big things.



COMPRESSOR
from an
1891 Woodcut



BAKER
Model F6B
Compressor

Baker

ICE MACHINE COMPANY, INC., OMAHA

MANUFACTURERS OF REFRIGERATION AND AIR CONDITIONING EQUIPMENT SINCE 1905

THE REFRIGERATION INDUSTRY



JIM: Hello, Frank. How were things while I was on my vacation?

FRANK: Sorry to say not too good. Our problems getting merchandise for orders seem to be worse rather than better.

JIM: I was thinking about all these things while I was away and made up my mind to go over the entire situation as soon as I got back to the store. Let's sit down and analyze the entire situation right now.

FRANK: That suits me, for we ought to try to work something out. We all thought our troubles would be over after the war, instead they seem to be getting worse.

JIM: It sure is bad. I suppose all wholesalers are in the same boat. I wonder if our customers have any idea how tough the going is?

FRANK: That's it—a lot seem to understand and go along. Others, however, get the idea that we don't try to take care of them, or are favoring some other customers in preference to them.

JIM: We've got to work to eliminate that idea. If these fellows would only stop and think this thing out, they'd realize we want their business, along with all we can handle and that we're not turning any business away we can take care of.

FRANK: That's what we try to tell them, but sometimes it's pretty hard to put the idea across. I think we have a real problem to work out to meet this situation.

JIM: First of all, are we getting much merchandise in?

FRANK: Shipments arrive every day, but many items are back ordered. Then, too, while we're actually getting more merchandise than ever before, from the overall picture, many important items are short and this upsets the whole picture. Also, our customers have larger orders placed with us than ever before, and stock goes out to fill back

orders as fast as it comes in. It doesn't get on the shelves, and that gives the impression we don't have any stock.

JIM: Do you think many customers are buying more merchandise than they need, as a protection to keep from running out of the different items when they need them?

FRANK: That's a natural thing to do when there's such a big demand in



"If you don't mind, ma'am, I'd rather not answer that question."

excess of supply and a good many may be doing so. I think I would if I were in their position.

JIM: You're right—anyone will try to protect his stock and have parts available. It gives him a great chance to get new and more business.

FRANK: We find ourselves in the same boat, and try to get all the stock we can; but as fast as it comes in many items never are supplied fast enough to come near taking care of back orders on file.

JIM: You said some important items are short. What are these items?

FRANK: The worst items right now are copper tubing, condensing



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• Whether you choose an Aerovox Universal (utmost convenience) or an Exact-Duplicate (perfect match) type for that motor-starting capacitor replacement, you are assured that it will definitely fit the job.

The latest Aerovox catalog contains the most extensive listings and cross-indexes yet issued. Yes, it's easy—and safe, too—to select the right Aerovox replacement for any capacitor-start motor. Why take chances?

• See Our Jobber . . .

He can help you choose the right Aerovox replacement for any standard capacitor-start motor. Ask to see the latest Aerovox catalog. Or write us.



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(CONCENTRATED)

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NO OBJECTIONAL ODOR

UTMOST IN LABOR SAVING

**CAN BE USED OVER
REPEATEDLY**

OFTEN IMITATED

IS SIMPLE TO APPLY

**LET YOUR REFRIGERATION
WHOLESALE EXPLAIN—
NOW**

SKASOL CORPORATION

112 GLENCOE AVE.

WEBSTER GROVES 19, MISSOURI

units, compressor bodies, belts, refrigerants, and some sizes and types of fittings. However, all the others are more or less spotty, too. Sometimes they come along pretty good, and then shipments slow up for a while.

JIM: What are we doing to try to get stock into the store?

FRANK: *We have started a system on ordering to try to improve our stock situation. It has made a lot more work for us and has to be watched very closely, but several manufacturers think it will help them improve production and enable them to give us more stock.*

It works like this—we analyze our past sales on an item, month by month, add what increase we think we need to take care of present business, then place orders for delivery each month for a three or four month period. This gives the manufacturer a chance to better estimate his requirements and set his production up to handle them.

The manufacturers are having their troubles getting raw materials and find unless they order well in advance they get caught short.

JIM: That does sound like a lot of extra work and it could also be pretty serious if it got our inventory out of balance.

FRANK: *That's true, but the way business is coming in there doesn't seem to be any likelihood that we will get any excess inventory in our stock and, of course, we can revise or cancel any future orders if we find we are getting our inventory out of balance so long as we give the manufacturers enough notice so they in turn can adjust their production accordingly.*

JIM: That seems like a practical way to help meet this situation. Once we get our statistics set up to work this system for orders, it shouldn't add too much additional work for us.

FRANK: *We are watching stock and shipments pretty closely and are going to try to keep stock in balance if we can.*

JIM: It looks like this is all we can do to help meet the situation; I think we should go along this way until we get back somewhere near normal again.

NOW!

**FORGED FLARE NUTS
AND FITTINGS**

**Complete Stock
Prompt Shipment**

Electromatic

2100 INDIANA AVE
CHICAGO 16 ILLINOIS

REFRIGERANT CYLINDERS...

Continued from page 34

—and it would be very helpful—would be to return empties to their wholesalers as soon as the cylinders are empty. Also, when a large drum is almost empty, to fill what service cylinders are available from the remaining contents of the large drum and return the large drum without delay. No hoarding."

du Pont: "Consumers of methyl chloride can cure this cylinder shortage condition very easily if they immediately return empty cylinders, and order such quantities of methyl chloride as they expect to use within the next 30 to 60 days, not longer. If buying were done on this controlled basis, a turnover of cylinders approximately 3 times per year would be readily obtainable. With such a turnover all shipments could be made promptly, because the number of cylinders in methyl chloride service from the various manufacturers is more than ample.

"This turnover of 3 times per year is still much lower than that obtained by manufacturers of other compressed gases such as liquid chlorine. To obtain this increased turnover, however, calls for prompt and close cooperation between the servicemen, the wholesalers and manufacturers."

Eston: "We urge all customers to cooperate to the best of their ability in returning cylinders promptly so that they can be refilled and shipped out again."

Kinetic: "If cylinders are promptly

returned to the manufacturer it will insure supplies of refrigerant gases, but all too often cylinders are being retained for service purposes and not returned to the manufacturer.

"Owing to the fact that gases are now being introduced into refrigeration machines, the return of empty cylinders has improved, but this is always experienced at this season of the year."

Virginia: "Of course, we want the service trade to return cylinders promptly; but they have to run their



*Let's talk
about
Chemistry!*

THAWZONE DATA

That a chemical agent is needed in a refrigerating system is not always immediately apparent to the engineer.

The ideal refrigeration unit would have an inert fluid circulating in a system made up of completely inert parts. This is, of course, impossible to realize in practice. The most carefully installed system contains traces of air, moisture, acids and other impurities.

THAWZONE
PATENTED
The PIONEER FLUID DEHYDRANT

In other types of systems, such as aircraft radiators, hydraulic brakes, gasoline, etc., it has been found practical to use inhibitors to correct a situation, rather than to try to reach the ideal state in which corrosion and reactions do not occur. Similarly, in a refrigeration system THAWZONE is used to remove traces of water and air that cause freeze-ups and corrosion.

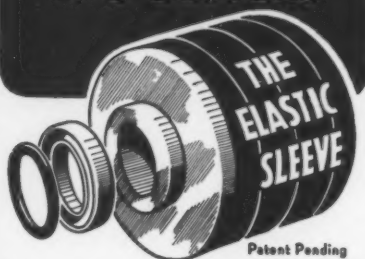
THAWZONE is a practical solution to the problem of impurities which are difficult to prevent or remove by other means. Ten years of constant use have shown that THAWZONE, as an additive agent to refrigeration systems, is eminently practical.

HIGHSIDE CHEMICALS CO.
195 VERONA AVE. NEWARK 4, N. J.

ALSO MAKERS OF

TRACE
REFRIGERANT
LEAK DETECTOR

**COMPARISON
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Write for Stock and Price List. Learn how you can save by eliminating "call backs".

TEMPERATURE
Control Devices
NEW HAVEN 15, CONNECTICUT

business and to charge condensing units they need containers of one kind or another. They, therefore, are utilizing the only available expedient—take refrigerants in any size container you can buy them, and let somebody else worry about the empties.

"... When containers are a part and parcel of the service business, indispensable equipment for getting the refrigerants in the job, when the service boys can't get the small sizes they want, who is to blame who?

"We believe that the only correction for the present situation is to put added quantities of small containers in service, which we are trying to do. This will automatically release large numbers of containers of larger capacity, which enable us to ship in volume poundage."

COLLEGE TEACHES COOLING

Northeastern State College, Tahlequah, Okla., is conducting a 12-month course in refrigeration, air conditioning, and appliances.

PLASTIC COATINGS FOR REFRIGERATOR CABINETS

Watson Standard Co., Pittsburgh, has expanded its Vyncote division in order to meet increasing demands for its series of vinyl plastic coatings for applications in the metal products industry, including both interior lining and exterior finish for refrigeration cabinets.

Developed as a result of wartime research for application to metal products, including aluminum and magnesium, the Vyncote plastics are said to form a flexible surface film that retains all the properties of solid plastics, being resistant to oil, water, grease, chemicals, etc., and adaptable to any baking cycle.

The coatings may be compounded to individual requirements, and are available in colors or water-clear. A technical data folder on the product is available upon request to the producer.

EXPORT DIVISION FORMED BY WEKSLER

Announcement of a newly formed export division to handle foreign inquiries and sales, has been made by H. Weksler, president of Weksler Thermometer Corp., New York.

The Weksler export division will be located at 11 West 42nd St., New York 18, under the management of the Richard Eisenmann Export Co.

TEXAS GROCERY OPENS 400-LOCKER PLANT

The Red and White Grocery in Iowa Park, Tex., has opened a frozen food locker plant with 406 lockers. As parts are available, more locker space will be added.

NEW W. VIRGINIA FIRM

Refrigeration & Electric Supply has been incorporated in Wheeling, W. Va., with \$25,000 capital. Incorporators are Arthur Reed, William H. Roth, and George H. Roth, all of Wheeling.

NEW LOCKER PLANT

A new locker plant has been opened in Kaw City, Okla., by Merle Hill, with 229 lockers completed. When finished it will have 152 280-pound lockers and 153 300-pound lockers.

A BAG OF *Profits* **FOR YOU!**



NIBCO *WROT Fittings*

SAVE TIME by standardizing on NIBCO WROT Copper Fittings. Formed in one step under tremendous pressure by our own patented processes, these unique fittings are so accurately formed and sized, so "round and square" that work moves faster and labor costs are lighter. They're packed in time-saving, strong cloth bags with the number, size and quantity of fitting in each plainly marked on the tag. Keep in step with the tempo of the times... specialize on copper plumbing with NIBCO Fittings and you'll build a name for yourself... and make more profit, too.

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CONTRACTORS

News • Activities • Plans

CONTRACTORS' BULLETIN OUTLINES STATUS OF WAGE, PRICE CONTROLS

A "special news letter" issued early in August by the National Association of Refrigeration Contractors from its headquarters in Cleveland gives a rather complete summary of service and installation price and wage controls under the restored OPA. In the thought that an up-to-date roundup will be of value to our contractor-readers, we present the NARC wage-price summary below:

"OPA'S RMPR-165 is again in effect, which means restoration of the controls on services of refrigerators, commercial and industrial refrigeration equipment up to 25 hp, and air conditioning systems up to 25 tons.

"1. An employer with eight or less employees can raise wages without approval or without filing any form with any agency, regardless of whether or not he intends to pass on the increase in his prices.

"OPA permits such service shop to add such increases to the customer's hourly

an employer with more than eight employees can raise wages without approval (except in the building-construction industry).

"By this procedure, however, he does not waive his right to file later an application for a price increase based upon such wage increase. However, before OPA will act on the application, it is first necessary to have the Wage Stabilization Board's approval of the increased wages already in effect. File Form 10 with your local or nearest Wage-Hour office.

"3. If an employer with more than eight employees wishes to increase his customer's hourly rate because of a wage increase, he must file Form 10 with the nearest Wage-Hour office for W.S.B. approval of the wage increase, as such approval must precede consideration and action by OPA. After wage increase approval, or at the time of the wage increase application, he should contact his nearest OPA district office. He should not put any customer hourly rate increases into effect without OPA's authorization.

"4. Where an employer has a signed labor agreement, common to the area or industry, even if it covers only two or three of his mechanics, he may now raise wages without filing or without approval; but if he needs a price increase, now or later, he should follow the No. 3 procedure with Form 10. However, if the employees have signed up with a union, but the employer has not, he is not bound by this provision of No. 4, but comes under Nos. 1, 2, or 3, as the case may be.

"All preceding information on necessary procedure to be followed if price relief is to be requested, also applies to this type of employer.

"5. Employers operating under MPR-251 (construction and installation work), cannot raise wages without the approval of the Wage Adjustment Board.

"6. Any wage decrease, or the establishment of wages in a new plant, new division or new department, must be approved by the Wage Stabilization Board."

DROP PRICE CONTROLS ON SOME EQUIPMENT

Amendment 37 to Supplementary Order 129, issued on July 26 by OPA and effective as of that date, exempts and suspends sales price controls on a list of hardware and mechanical equipment, including a number of refrigeration items.

Only a digest of the action is given here; for a complete copy of Amendment 37 to SO 129 see your nearest OPA office.

Included in the items on which

THE application of mechanical refrigeration to meat packing plants, together with valuable new tabular data relating to this subject, is contained in Application Data Section No. 36 just issued by the American Society of Refrigerating Engineers.

Purpose of this concise pamphlet is to indicate the principal facilities used in meat packing plants with their methods of operation, and to present the most favorable refrigeration methods with the generally accepted temperature and humidity values.

In addition, there is presented uniform information pertaining to refrigerated spaces and miscellaneous packing house data that should prove valuable to anyone interested in designing or installing refrigeration equipment for meat packing plants.

Sketches are included showing the air flow and brine spray over the suspended carcasses, location of pipe coils, air ducts and also floor plans of a two-story medium size meat packing plant.

rate as per Amendment 4 to SSR 22 of RMPR-165, effective May 25, 1946; but requires a statement to be filed with your local OPA price control board as per paragraph (d) of SSR 22 to RMPR-165. Further, such increases may not be made more often than once every 30 days.

"2. If no price relief is to be requested,

price controls are suspended are:

Certain heating and winter air conditioning equipment.

Mechanically operated commercial refrigeration and summer air conditioning equipment and accessories covered by MPR 591 and the GMPR, as follows:

1. Air conditioning units, self-contained, over 1 hp to 12,000 Btu and up to but not including 25 hp.

2. Beverage cooling and dispensing equipment.

3. Coils and fan coils, except those manufactured from glass, designed for cooling purposes only.

4. Condensing units, over 1 hp and up to

but not including 25 hp, or 25 tons.

5. Cabinets as follows: Ice cube makers, cabinet type.

6. Evaporative condensers.

7. Insulated cold storage doors.

8. Refrigerated beverage coolers, water coolers, milk coolers, salad coolers.

9. Refrigerated counters and display cases as follows: Counter and back bar refrigerators; and display cases, all types.

10. Refrigeration compressors, over 10 hp and up to but not including 25 hp, or 25 tons.

11. Refrigerators over 16 cu ft capacity, as follows: commercial, display, reach-in, walk-in.

N.Y. TO TIGHTEN PERMITS ON WATER-COOLED JOBS

Water supply regulations of the New York City Department of Water Supply, Gas and Electricity pertaining to water-cooled condensing units for refrigeration and air conditioning will be more strictly enforced now that the manpower situation has eased, refrigeration men in the area have been advised.

Rules 45 through 48 of the regulations are especially applicable to refrigeration and air conditioning jobs. Rule 45 requires a water permit for use of the water-cooled refrigerating machine, which need not necessarily be obtained before the installation is made. This rule also requires that, where the minimum rate of water exceeds $\frac{1}{2}$ gallon per minute, the supply shall be metered; no special meter is required if there is already a meter on the premises.

Rule 46 requires use of a water conserving device (cooling tower, evaporative condenser, economizer) in installations for a single consumer



"The way it's been acting lately, I figured the head pressure was a little high."

where the waste water is more than the equivalent of a continuous flow of 5 gallons of city water per minute. In systems rated at 25 tons or more, or using 50 gallons or more of water per minute, the use of a separate water meter may be required.

Rule 47 provides that each direct water connection to a refrigerating unit using water for cooling purposes shall be equipped with a check valve, except in installations where the water supply piping has no contact with the refrigerant. Units with a capacity of more than 20 lbs. of refrigerant are to be provided with a relief valve installed on the outlet side of the check valve, and set at 5 lbs. above the maximum water pressure at the point of installation.



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FLOW, ELECTRICAL AND LEVEL
MEASURING INSTRUMENTS

6 out of 10
manufacturers of
original equipment
specify U. S. G.

UNITED STATES GAUGE

DIVISION OF AMERICAN MACHINE AND METALS, INC.

SELLERSVILLE, PENNSYLVANIA (1)

COMBINATION LOCKER AND PACKING PLANT FOR GREENFIELD, IND.

A new combination abattoir meat packing and locker plant, said to be first of its kind in the state, is expected to be ready for operation in September at Greenfield, Ind. The engineering layout for the plant, which will be operated by Dale Webb, was handled by F. H. Langsenkamp Co. under the direction of John A. Kollins, refrigerating engineer.

Langsenkamp is furnishing the Freon refrigeration machinery, insulation, freezing units and all automatic controls for the installation. The plant comprises, in addition to complete slaughtering facilities, a locker storage layout including chill, aging, quick-freezing (minus 20 F.), and storage departments, and a processing department which includes sausage making equipment.

Pickling room is equipped for ham pumping, wet and dry cure products. Modern smoke house and lard processing facilities also are provided. Water for the plant is obtained from a deep well, equipped with a turbine pump automatically controlled from a pressure tank.

NEW SEMI-TRAILERS USE KOLD-HOLD PLATES

Franklin Ice Cream Co., Kansas City, Mo., recently inaugurated a new fleet of eight semi-trailer delivery trucks featuring Kold-Hold streamlined hold-over plates.

Each of the new trucks is equipped with seven Model D-805 hold-over evaporator type refrigerator plates to handle an ice cream load of 1600 gallons capacity, maintaining a maximum operating refrigeration temperature of -18 F.

Plug-in compressor units, mounted in the truck body, can be used, wherever electricity is available, for building up "hold-over" refrigeration, allowing the goods that have been carried over from the daytime run to be left in the truck overnight, and eliminating extra time spent in unloading and reloading.

The truck bodies, made by Herman Body Co. of St. Louis, are divided into three compartments—two end compartments and a drop center compartment. Two of the hold-over plates serve as partitions, with two more at either end of the truck and three located in the roof.

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SAVING!**

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HAND
CLEANER**

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ECONOMICAL!

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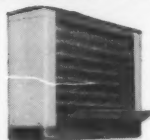
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They know that the various Green Dragon components are originally built to be integrated into a complete, well functioning, dependable system.

We are manufacturers for the wholesaler. The wholesaler is our exclusive distributor. Together we serve.

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The MARKET Place

POSITION WANTED

Man 22 years active refrigeration and air conditioning service and installation experience, desires connection in a supervisory capacity. N. Y. C. location preferred but will consider others. Capable of running any size operation also of developing new products and methods. Box 9246, Refrigeration Industry.

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EXPERIENCED refrigeration service man wanted. Must be first class mechanic. Opening is with leading western G. E. dealer. Wire details collect if interested. Idaho Falls Electric Co., Idaho Falls, Idaho.

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FOR SALE: 12 - 16 - 19 - 22 and 26 cubic ft freezer cabinets. Write for list and prices. Rathbun Refrigeration Company, 44 Market Avenue, N.W., Grand Rapids 2, Michigan.

Complete Refrigeration Sales and Service Business. Commercial, Industrial and Domestic. In 5 months a gross business of \$40,000, mostly service. Chance for big increase over this with new merchandise now available. Box 9146, Refrigeration Industry.

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20 cu. ft. all-steel glass top Freezers, Ice Cream, Frozen Food open and closed cabinets; Reach-ins, Wood and Metal Storage Boxes; Beverage Coolers; Air Conditioning Units; Motors 5-20 h.p.; etc. Frigitemp Corp., 931 Bergen St., Brooklyn 16, N. Y. Main 2-9093.

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Soft—can be flexed or coiled.
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FOR SALE — Air-cooled & Water-cooled, remanufactured condensing units, 1/4 up to 2 H.P. Write for particulars, Edison Cooling Corp., 310 East 149 St., Bronx 51, N. Y.

FOR SALE: 9 x 9 Frick forst-feed compressor, serial #28473. 50 hp motor, 900 rpm with belts, starter, 2 Frick horizontal 12 x 12 condensers; 1 oil trap, ammonia receiver and all piping pertaining to ice machine including valves, gauge board and gauges.

9 x 9 York splash-feed compressor with highside, 3 phase, 60 cycle, 40 hp, 900 rpm motor, serial #8651.

5 x 5 York force-feed duplex compressor, serial #29627.

4 x 4 Frick duplex compressor #18133.

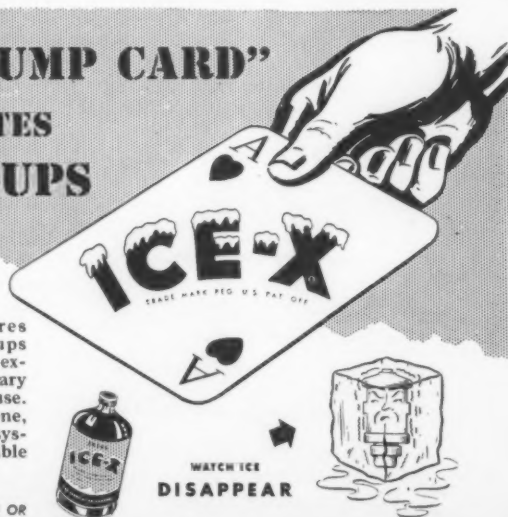
2 shell and tube condensers 18', 32 pipes: also ammonia receivers, same capacity, \$700.00. Box 9346, Refrigeration Industry.

EQUIPMENT WANTED

Wanted 12 Dry Ice Plants for the manufacture of CO₂ gas and solids, capacity 1 to 2 tons. Please apply to Dry Ice Utilizing Co., Ujjain (India).

New or used, 2 Freon condensing units, 12 to 15 tons cap. each at minus 30° Refrig. temp. including motors—220 volt—60 cycle —3 phase. One 10 h.p. Freon condensing unit with motor. Before Nov. 1, 1946. Pope Engineering Co., 8507 N. Pt. Wash. Rd., Milwaukee 9, Wis.

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ICE-X quickly cures emergency freeze ups when ice forms at the expansion valve or capillary tube. Harmless to use. Great for Freon, Carrene, or Methyl Chloride systems... The dependable liquid anti-freeze.

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VALVE
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THREE
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A-P Model 205
Thermostatic Expansion
Valve. Popular for
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2½ tons Freon, and
air conditioning capacity
up to 3¼ tons Freon.

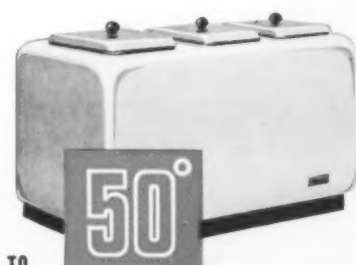
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Valves to maintain straightline superheat—actually less than ¼° variation
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America finds a new, easy way to save

OUT of the war has come one blessing—a lesson in thrift for millions of those who never before had learned to save.

Enrolled under the Payroll Savings Plan in thousands of factories, offices, and stores, over 27 million American wage earners were purchasing "E" Bonds alone at the rate of about 6 billion dollars worth a year by the time V-J Day arrived.

With War Bond Savings automatically deducted from their wages every week, thrift was "painless" to these wage earners. At the end of the war, many who never before had bank accounts could scarcely believe the savings they held.

The moral was plain to most. Here was a new, easy way to save; one as well suited to the future as to the past. Result: Today, millions of Americans are continuing to buy, through their Payroll Savings Plan, not War Bonds, but their peacetime equivalent—*U. S. Savings Bonds*.



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6.25	325.00	3,607.54
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12.50	650.00	7,317.20
15.00	780.00	8,660.42
18.75	975.00	10,828.74

Savings chart. Plan above shows how even modest weekly savings can grow into big figures. Moral: Join your Payroll Savings Plan next payday.

**SAVE THE EASY WAY...
BUY YOUR BONDS
THROUGH PAYROLL SAVINGS**

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